Cédric Séaut's

Character Modeling

3DTotal.com eBook series

chapter 01

Concept

CHAPTER 01 - CONCEPT

Software Used: ZBrush, 3ds Max, Silo, and Photoshop

INTRODUCTION

There are several ways to come up with a concept, the most obvious one being to draw a quick shape in 2D to define the main volumes, but you can also start from a very simple base mesh and play with volumes in ZBrush. The advantage of this technique is that you can make one base mesh that you can then reuse for many other concepts, and the second advantage is that you will have a solid 3D base to then work from to polish the character.

PART 1A – SIMPLE BASE MESH CREATION

For this character I'm using an old base mesh that I have changed slightly for this tutorial, but I will show you the way I would usually create one from a simple primitive so you can start from scratch.

1. Create a box primitive in 3ds Max with the parameters, as shown in **Fig.01**.

2. We are going to center this box at the center of the 3ds Max scene. To do this, simply right-click on the button in the top-left, as shown in **Fig.02**; a pop-up will display – just enter 0, 0, 0 for the X, Y, and Z values.

3. To be able to modify the object, convert it into Editable Poly, just select the cube, right-click on it, and select Convert to Editable Poly from the list (**Fig.03**).

4. To make the modeling easier, we are going to remove the half right of the object and work on the left side only. In your polygon selection, select the right side and delete it (**Fig.04**).

Fig 01

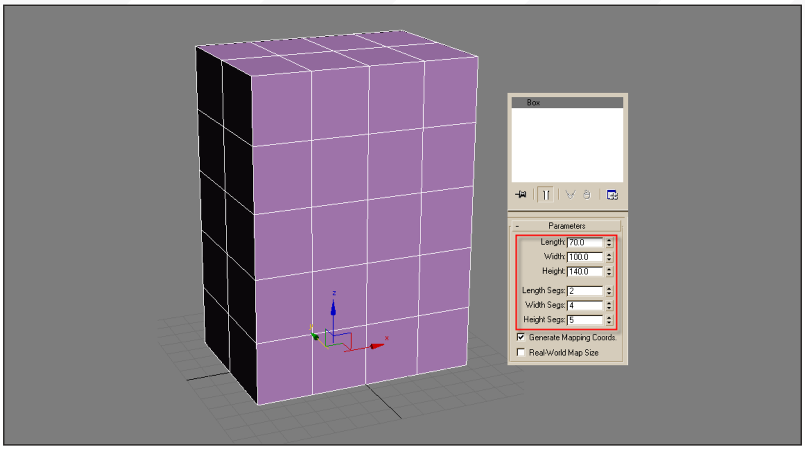


Fig 02

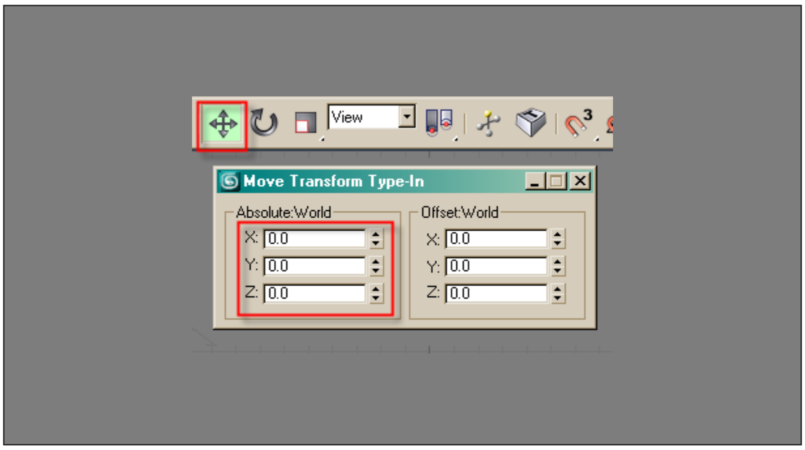


Fig 03

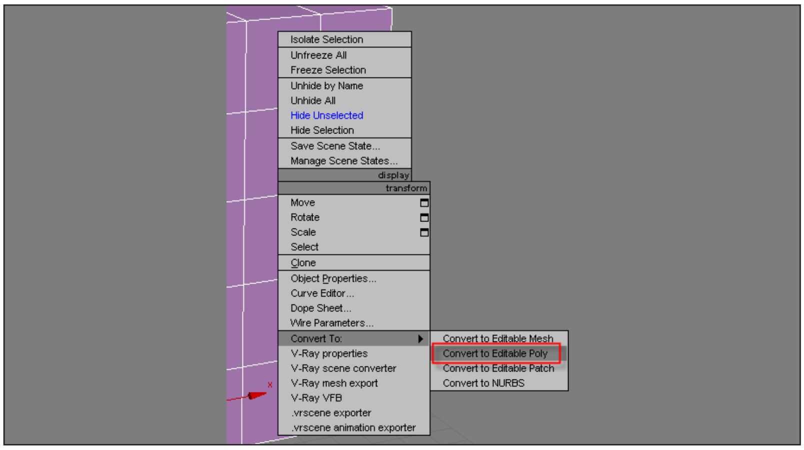
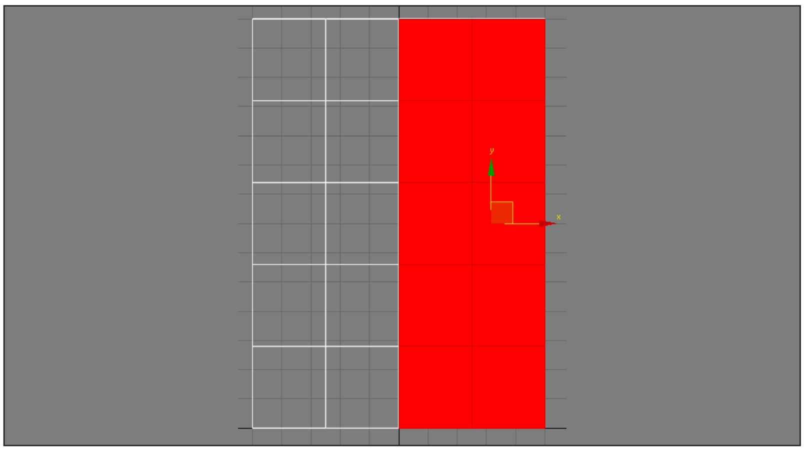
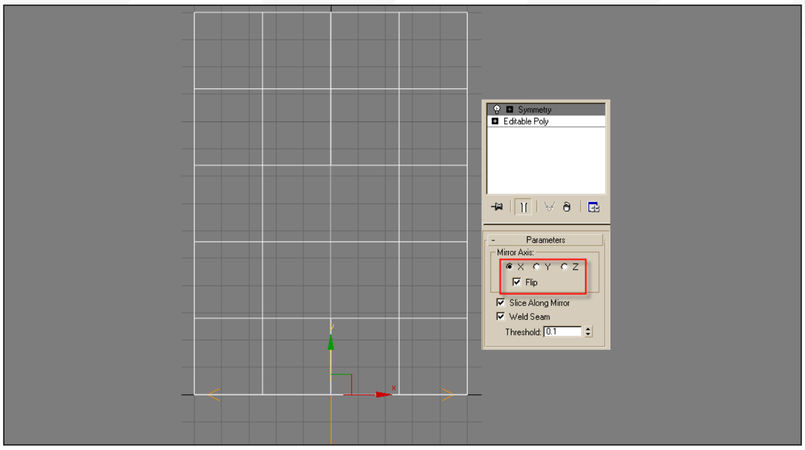


Fig 04



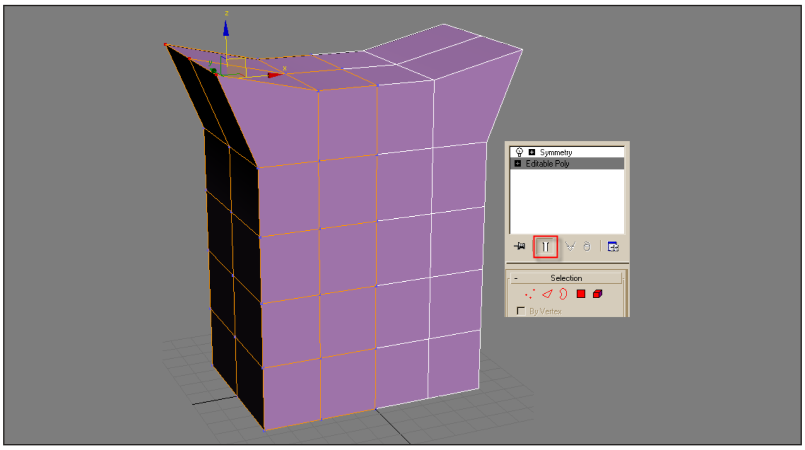
5. It's time now to create an instance of the active part (the left one). Apply a Symmetry Modifier – don't forget to select Flip, otherwise you won't see anything in the scene. Because your object is in the middle of 3ds Max scene, everything will work fine automatically (**Fig.05**).

Fig 05



6. To test if everything is setup well, go back to Editable Poly in the stack – don't forget to click on the white T-shaped icon (**Fig.06**), otherwise you won't be able to see the right side and will only be able to play around with the left. In Vertex mode, select some and move them – the opposite side (right) will mirror what you're doing exactly on the left, in real time.

Fig 06

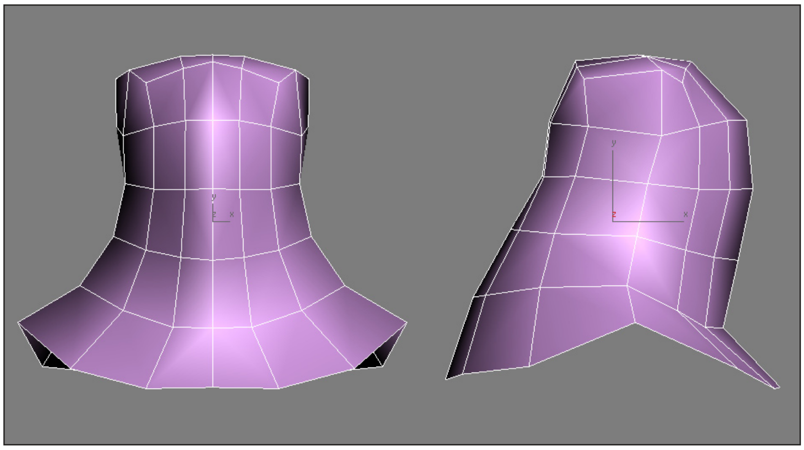


7. Let's start with the head: We are going to keep it very simple. The goal is to prepare a base mesh as cleanly as possible to be used for sculpting. This means:

- As many quads as possible (triangles are allowed, but avoid stars as ZBrush doesn't work properly with polygons with more than 4-sides)
- Keeping polygons as evenly spaced as possible; you'll have better results while sculpting

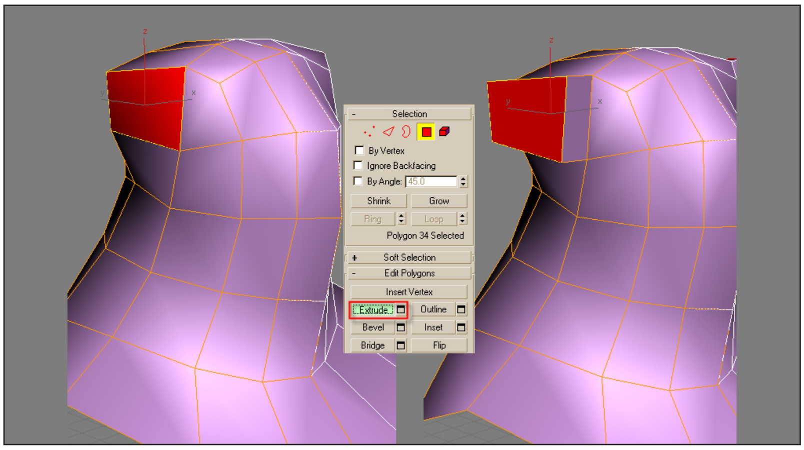
In **Fig.07** is a preview of the head. As you can see, at the top of the head, some space has been left to extrude a horn from it later on (something I have in mind for the concept).

Fig 07



8. Select the polygon on the top and extrude it by clicking on the Extrude button (**Fig.08**).

Fig 08



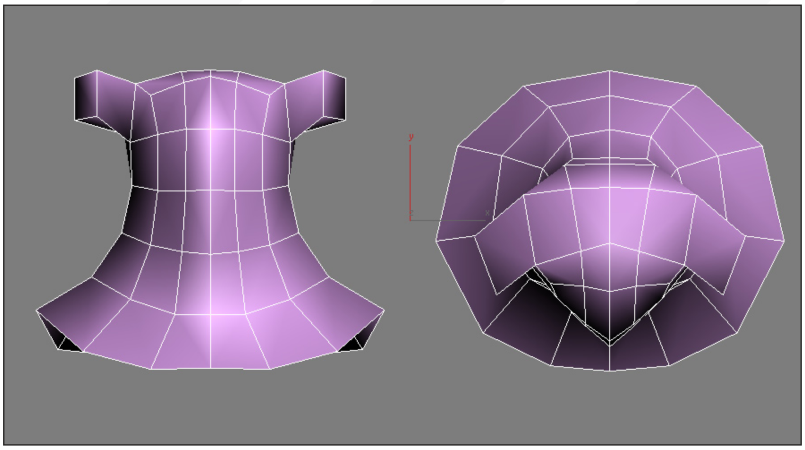


Fig 09

9. Here are some screenshots of the head with the horns (**Fig.09**). The position of the horns doesn't need to be perfect at this stage; keep in mind you can do absolutely everything you want inside ZBrush – they just need to be there, we can maneuver them later on.

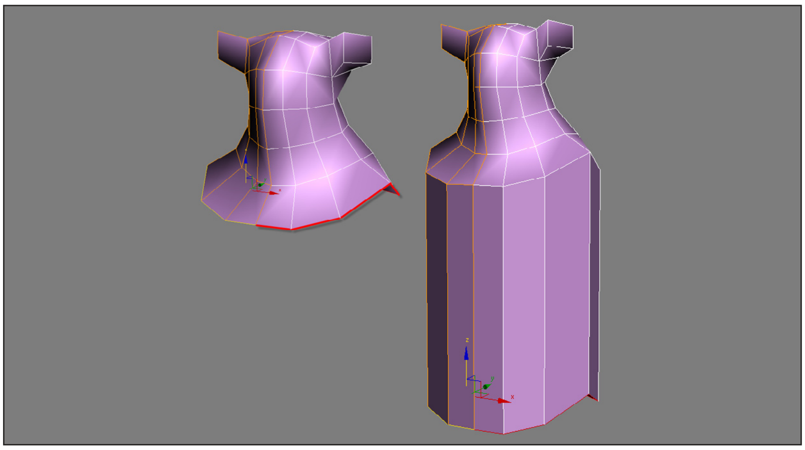


Fig 10

10. Now we're going to move onto the torso. Simply select all the edges at the bottom, in Edge mode, and by pressing Shift move them downwards (**Fig.10**).

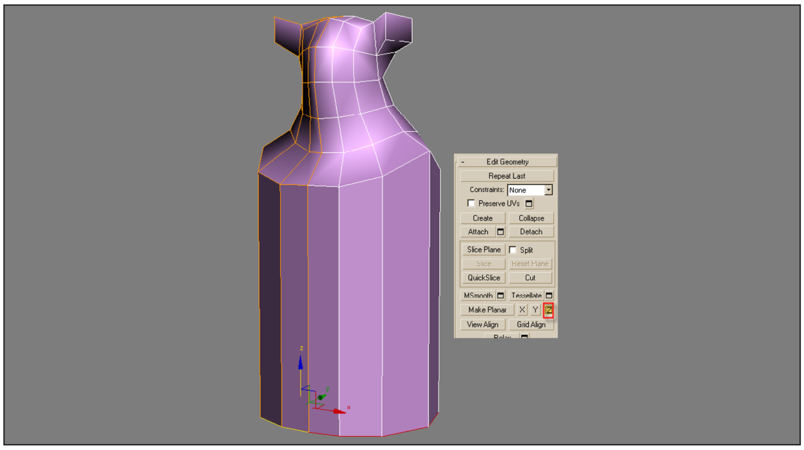


Fig 11

11. It is still best to keep things straight at the moment, so flatten them by pressing the Z button, as shown in **Fig.11**, to align them along the Z-axis.

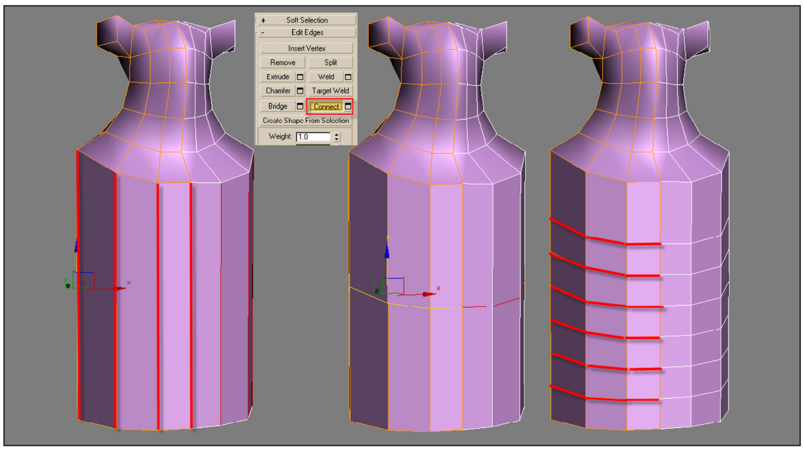
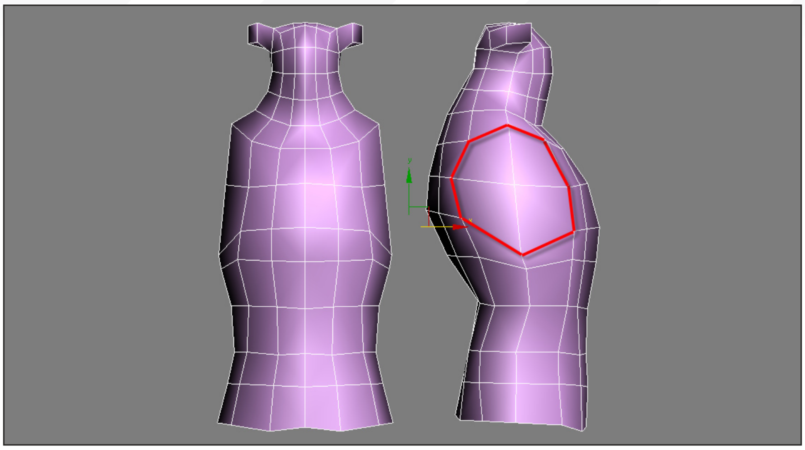


Fig 12

12. To be able to come up with a good shape, we are now going to add some edge loops. Select all the edges, as shown in **Fig.12**, and click on the Connect button. This will create a new edge loop in the middle of the previous selection. Redo the operation several times to get more edge loops.

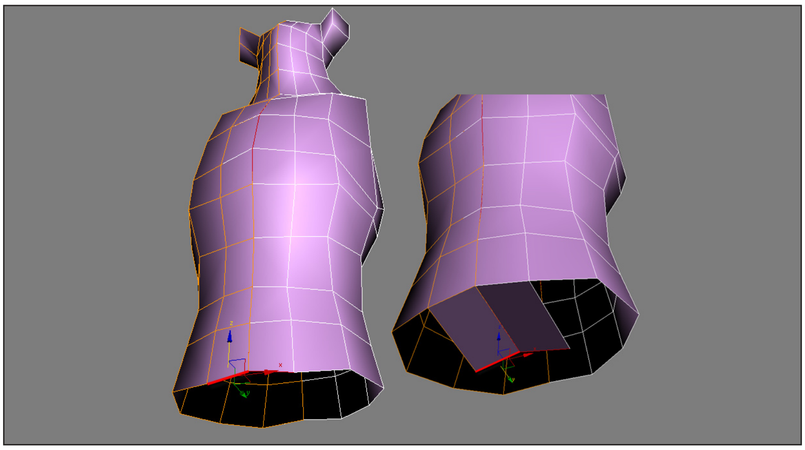
13. Move some vertices now to get a more human-like shape, but once again, don't worry if it doesn't look perfect because this is something we can change very easily and quickly later on in ZBrush. Don't forget to leave some space on the side to prepare the shoulder and the arm ! (**Fig.13**)

Fig 13



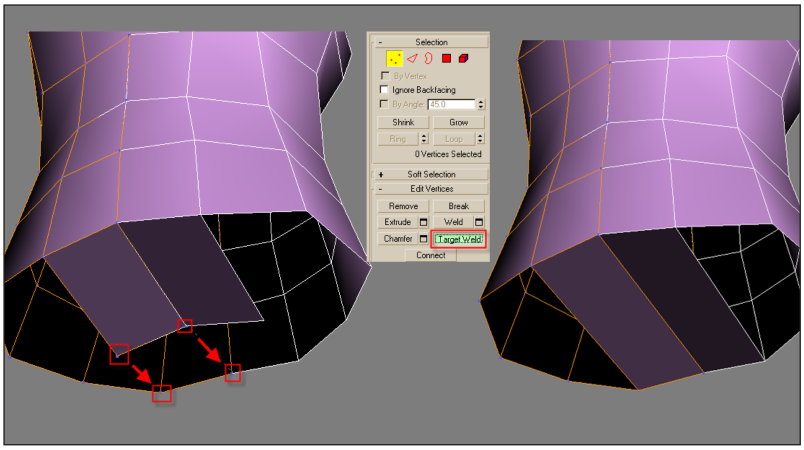
14. We are going now to close a part of the object at the bottom, which will be the crotch area, in-between the legs. Select the edge, as shown in **Fig.14**, and extrude it by pressing Shift.

Fig 14



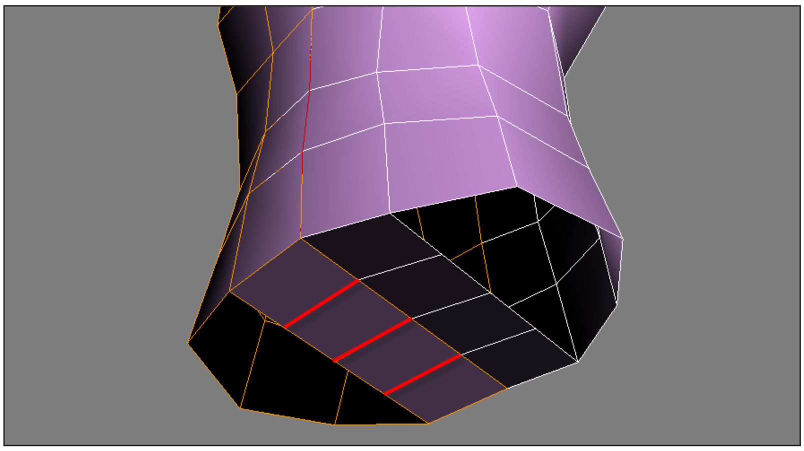
15. Click on Target Weld, and one-by-one select first the origin vertex, and then the target (**Fig.15**).

Fig 15



16. In the same way as explained before (see step 13), cut the new face with 3 edges (**Fig.16**).

Fig 16



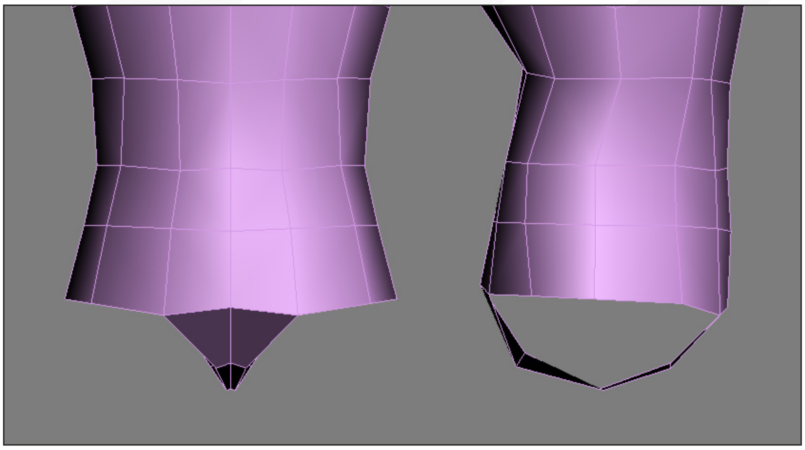


Fig 17

17. Move some vertices to achieve something that looks like what is shown in **Fig.17**.

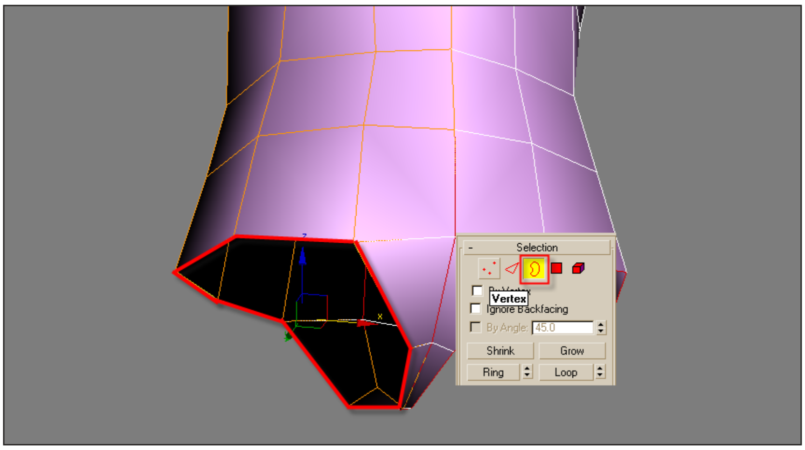


Fig 18

18. Select the area which will be the beginning of the thigh, in border mode (**Fig.18**).

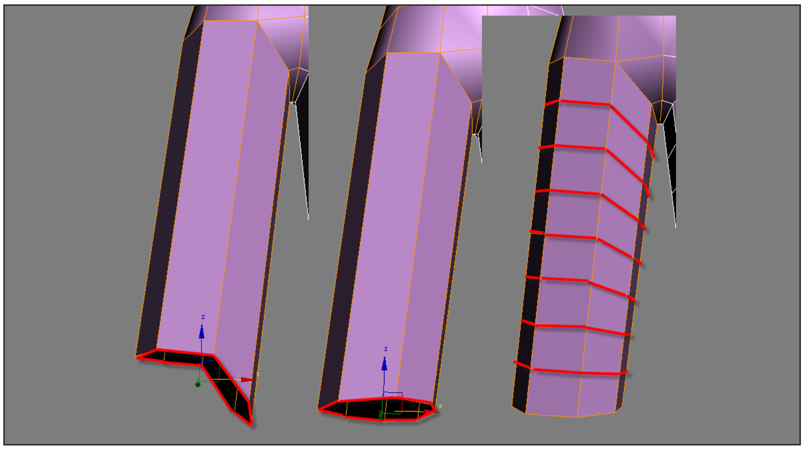


Fig 19

19. As you previously did for the torso (see step 12), extrude the leg and create some edge loops on the new extension (**Fig.19**).

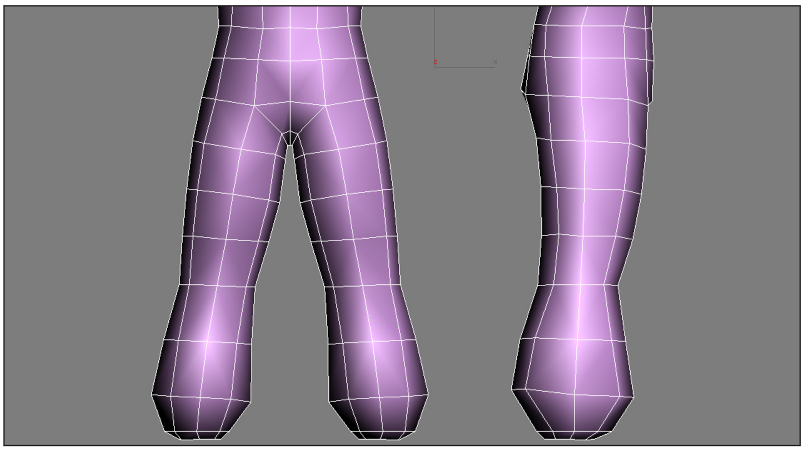
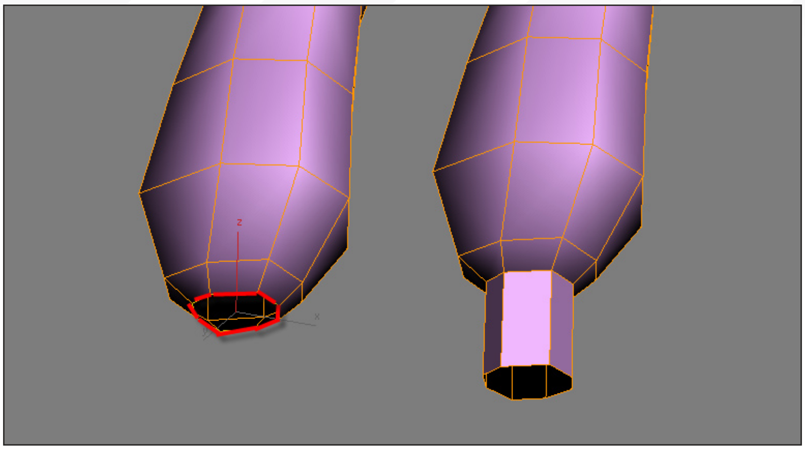


Fig 20

20. Here are some screenshots of the legs. Try to make it thinner at the bottom as this will represent the beginning of the shoe (**Fig.20**).

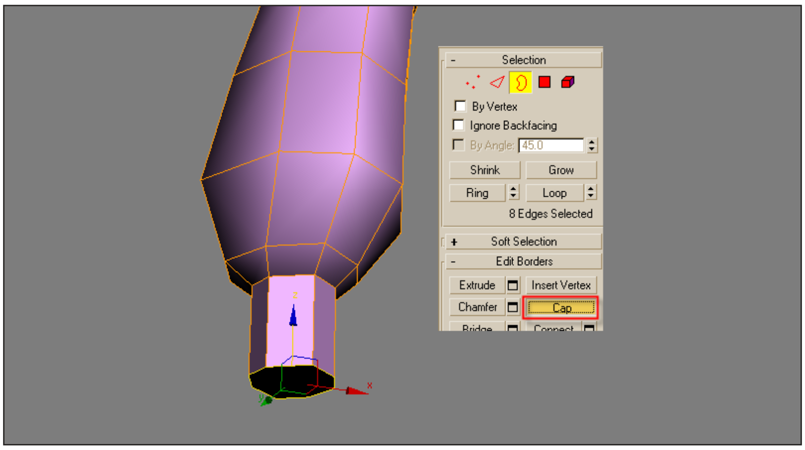
21. Select the border at the bottom and extrude it by pressing Shift. You have now a foot (**Fig.21**).

Fig 21



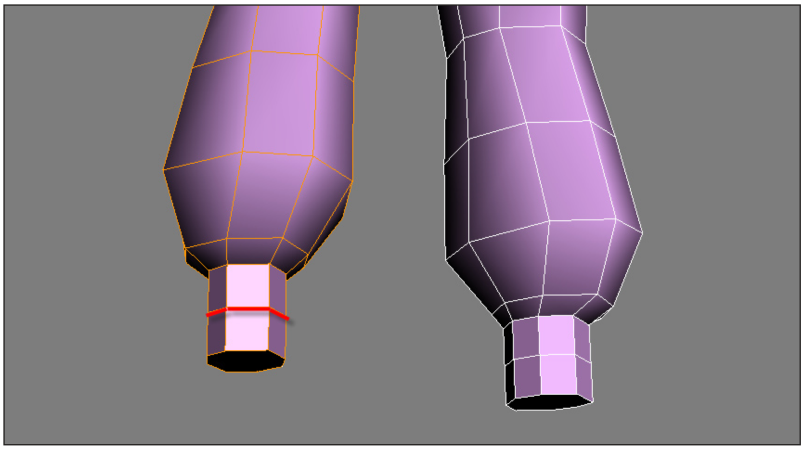
22. Once again, select the border and press Cap to close the object (**Fig.22**).

Fig 22



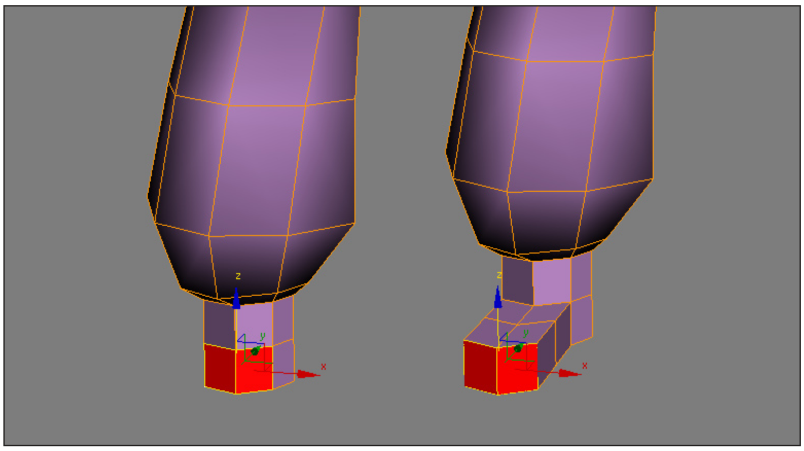
23. Create an edge loop at the middle of that new extension (**Fig.23**).

Fig 23



24. Select the two faces on the front and extrude them twice by pressing the Extrude button (**Fig.24**).

Fig 24



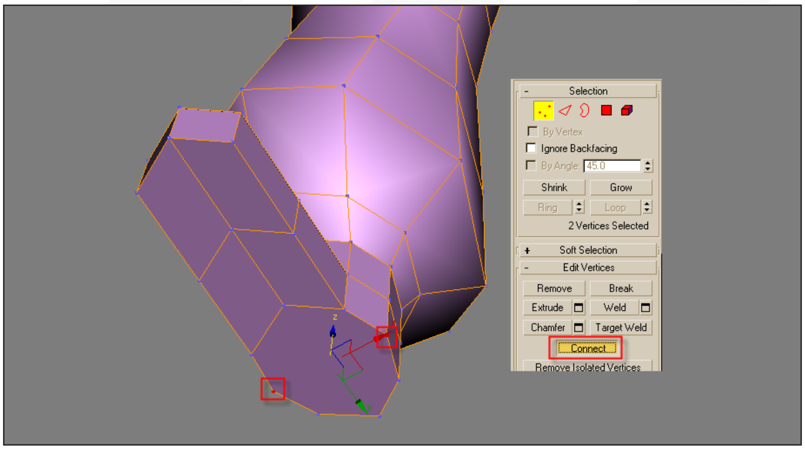


Fig 25

25. Under the shoe, select both vertices, as shown in **Fig.25**, and press Connect to create an edge.

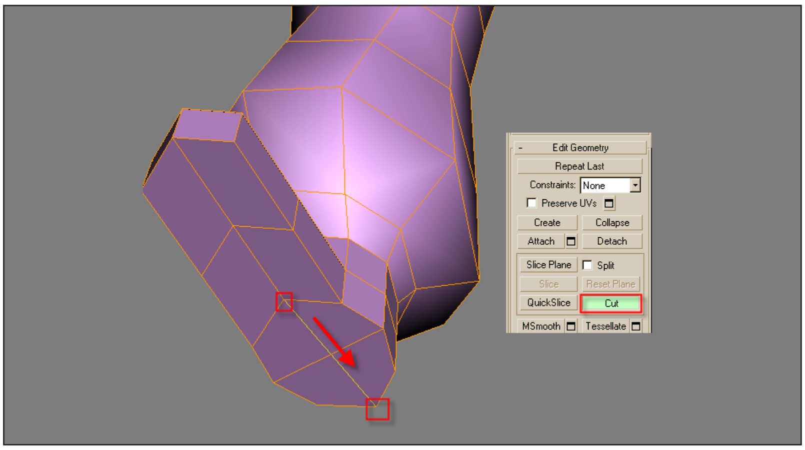


Fig 26

26. Press Cut, and then select the first vertex and the second to create the second edge. The edge at the middle of the vertices will automatically be cut (**Fig.26**).

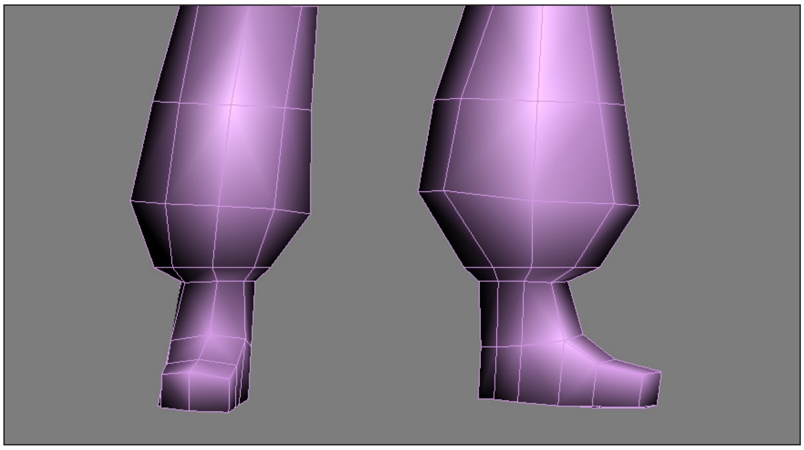


Fig 27

27. Here is a preview of the shoes (**Fig.27**).

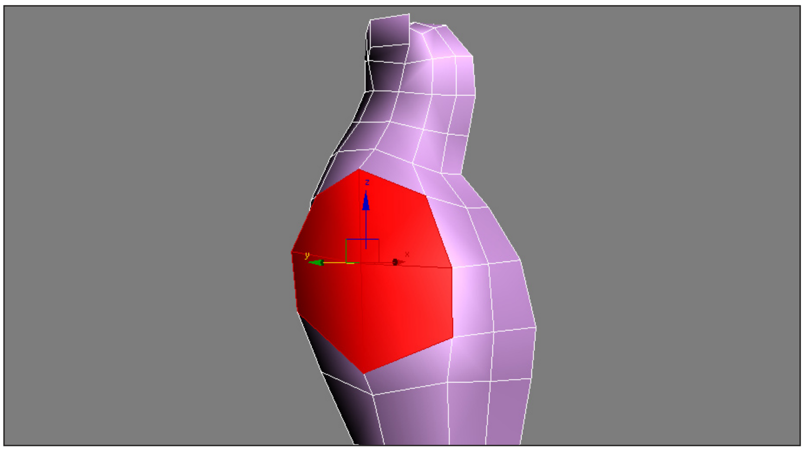
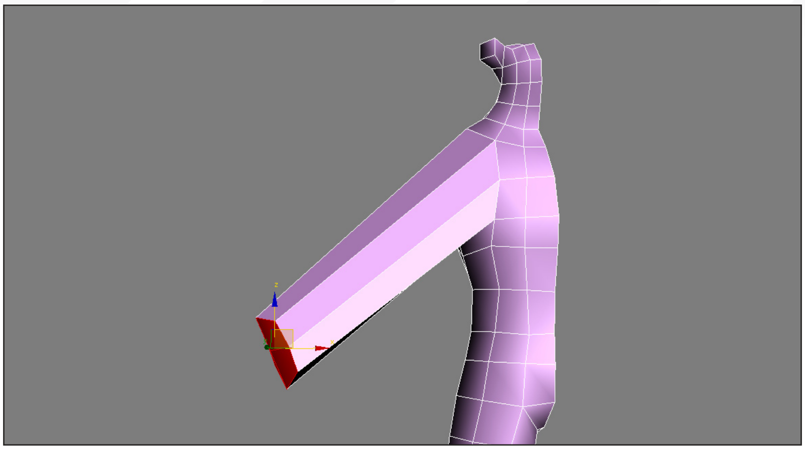


Fig 28

28. Go back to the chest now, and select the area you created before for the shoulder (**Fig.28**).

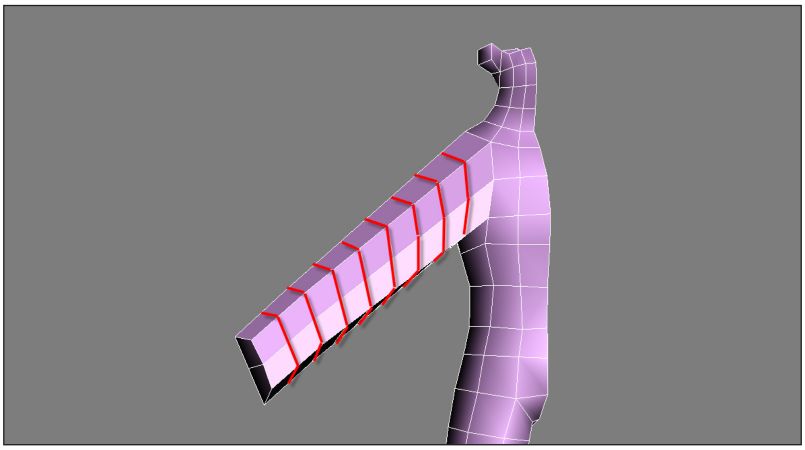
29. Extrude it, just like you've already done for the legs and torso (**Fig.29**).

Fig 29



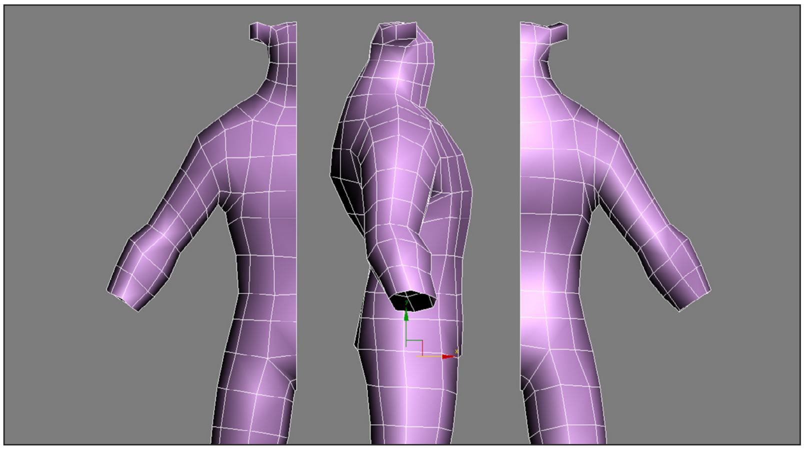
30. Make some cuts with the same technique we used previously for the legs (**Fig.30**).

Fig 30



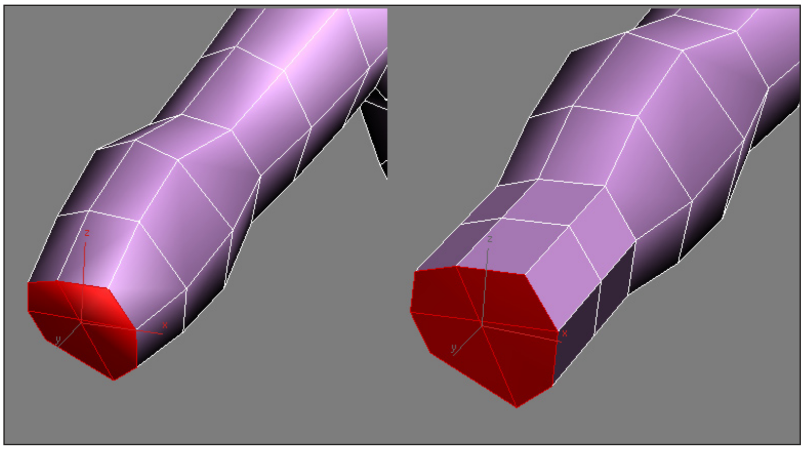
31. Move some vertices to get a rough human shape. Scale it down a little, as the last edge loop will be the wrist (**Fig.31**).

Fig 31



32. Now we are going to work on possibly the most difficult part – the hands. This character will have only 4 fingers, as this is what I have in mind for my character. So select the faces at the extremity and extrude them twice (**Fig.32**).

Fig 32



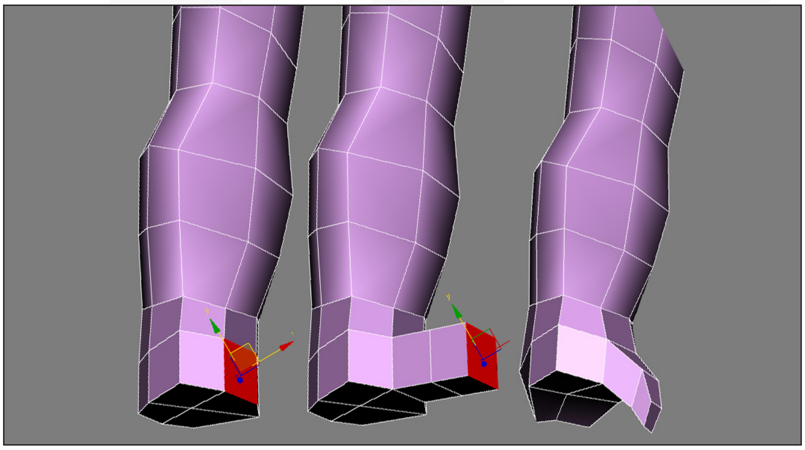


Fig 33

33. Select the face, as shown in **Fig.33**. Extrude once, twice, and then the vertices a little to get more of a thumb shape.

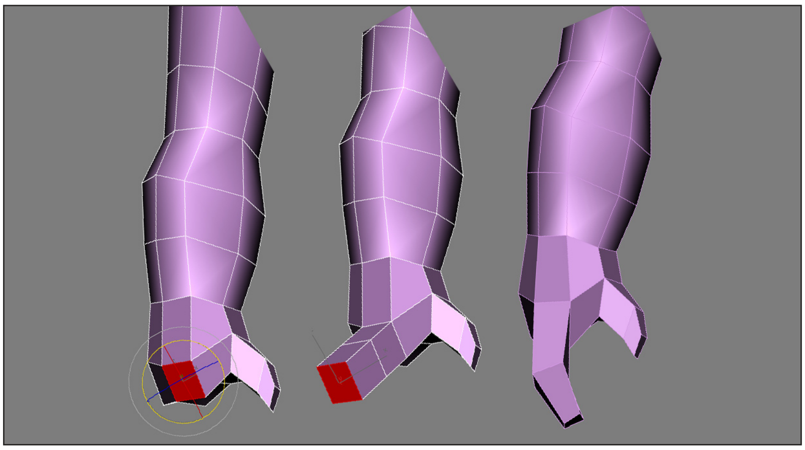


Fig 34

34. Use the same procedure for the second finger (**Fig.34**).

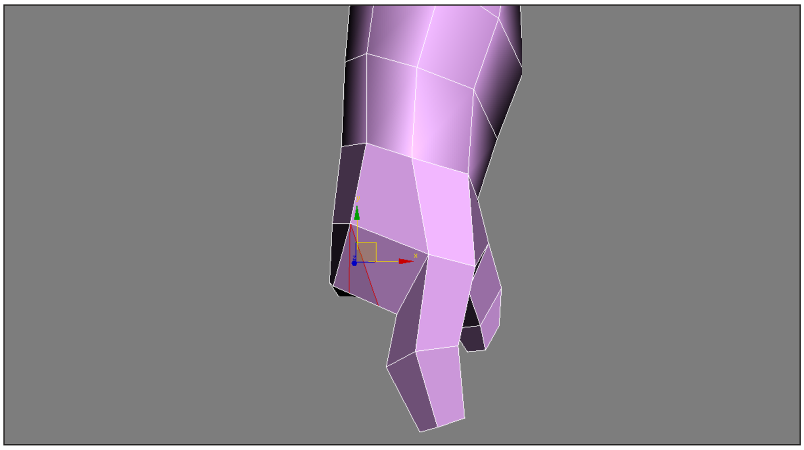


Fig 35

35. For the other two fingers it will be a little bit more complex, because we have to create two fingers from only one face. So cut the face, as shown in **Fig.35**, by pressing the Cut button (see step 26).

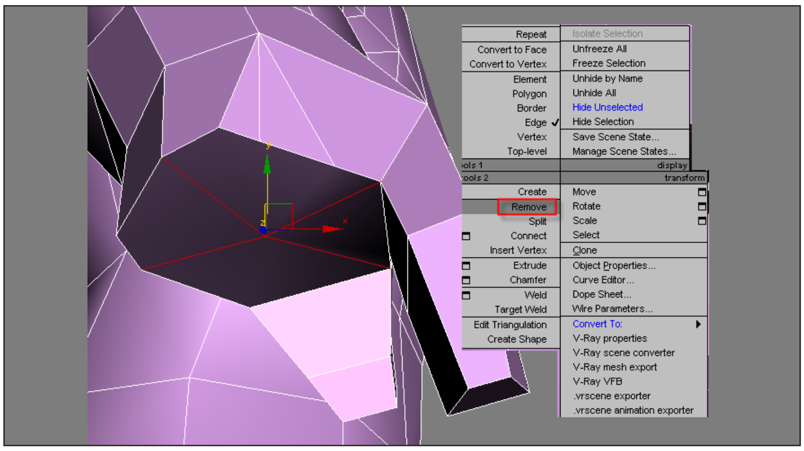
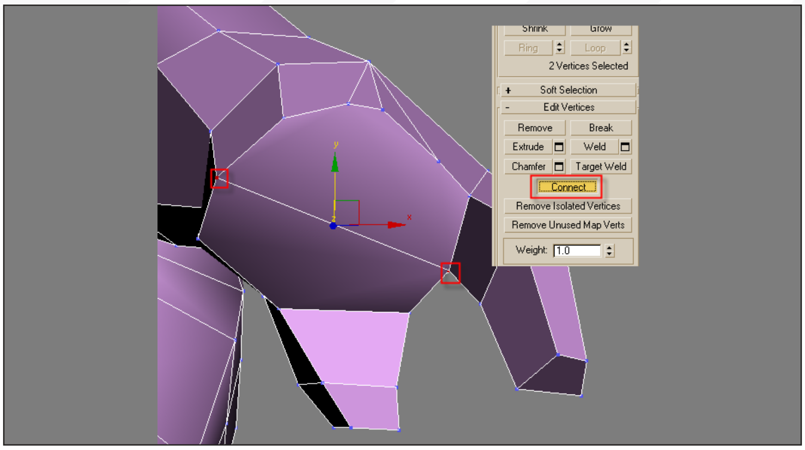


Fig 36

36. Under the hand, select the edges and remove them by right-clicking and selecting Remove (**Fig.36**). Don't press Delete as that will delete everything – faces included!

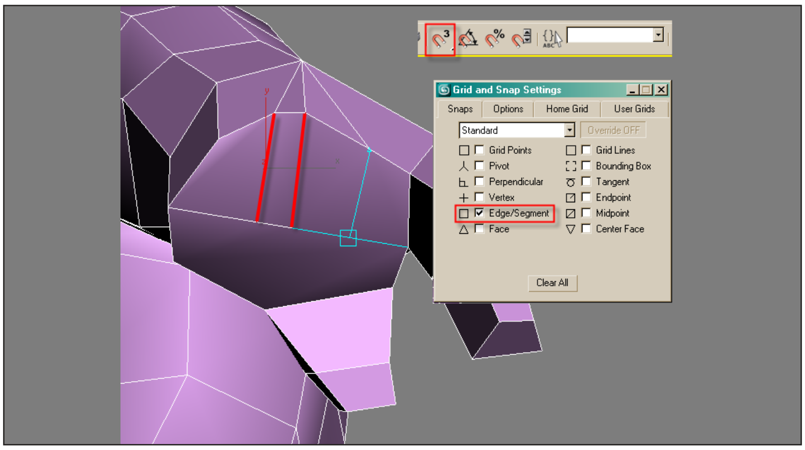
37. We are going to change edge orientation now to be able to extrude some fingers. Select the vertices and create an edge by pressing Connect (**Fig.37**).

Fig 37



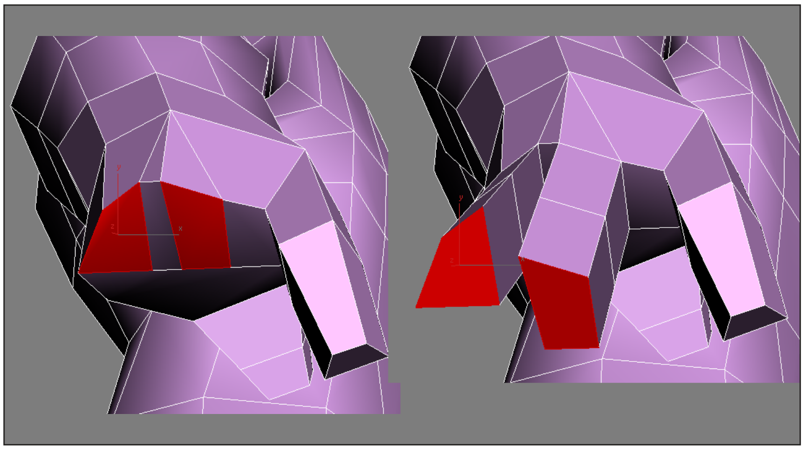
38. Now we can cut once more to prepare the bases of the finger. First of all, right-click on the Snap button in the toolbar. A pop-up will appears – tick Edge/Segment. This option is really important as it will help you to auto detect edges and you'll be able to better manage and make good cuts. So now, make three cuts by pressing the Cut button (**Fig.38**).

Fig 38



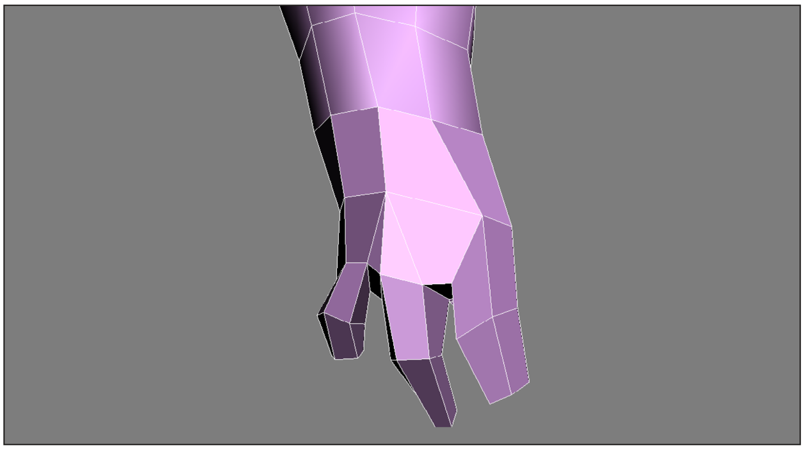
39. You are now ready to select two faces and make two extrusions from both of them (**Fig.39**).

Fig 39



40. Move the vertices to achieve a hand-like shape (**Fig.40**).

Fig 40



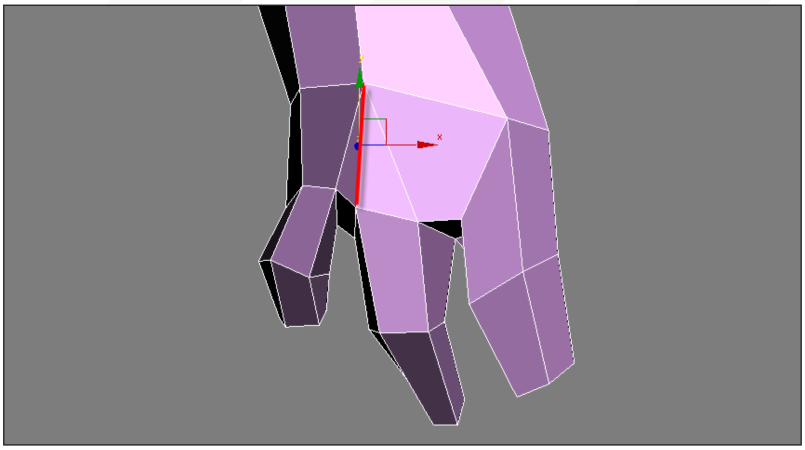


Fig 41

41. Delete the edge as shown, to keep only quads (**Fig.41**).

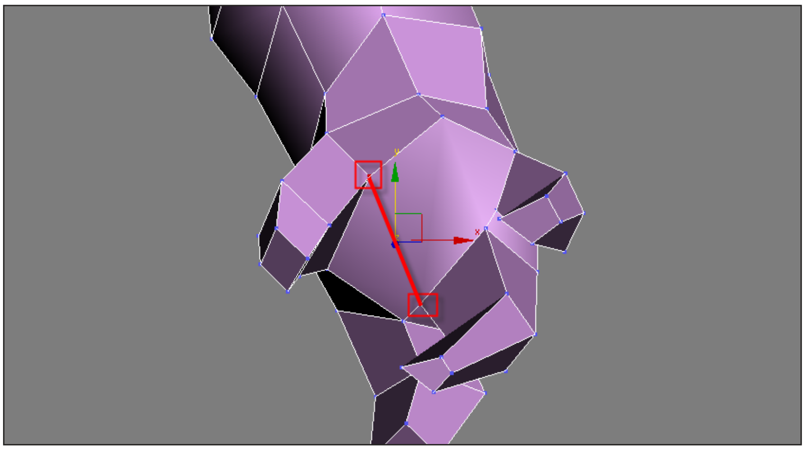


Fig 42

42. Connect vertices, as shown in **Fig.42**, for the same reason as before.

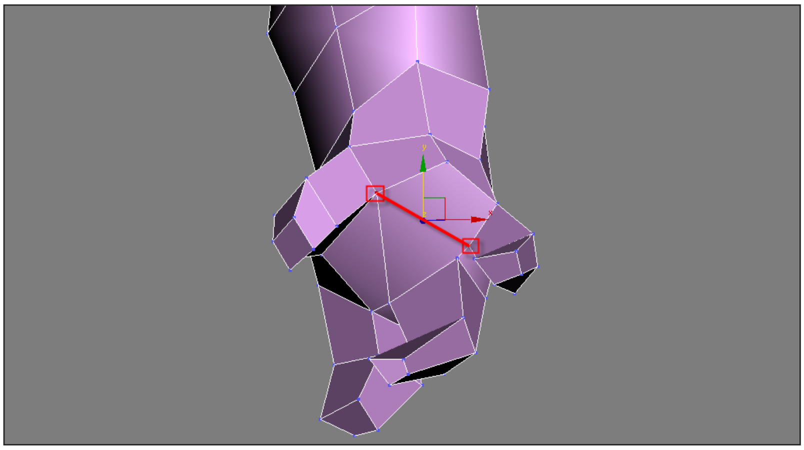


Fig 43

43. And once again for the last more-than-4-sided polygon (**Fig.43**).

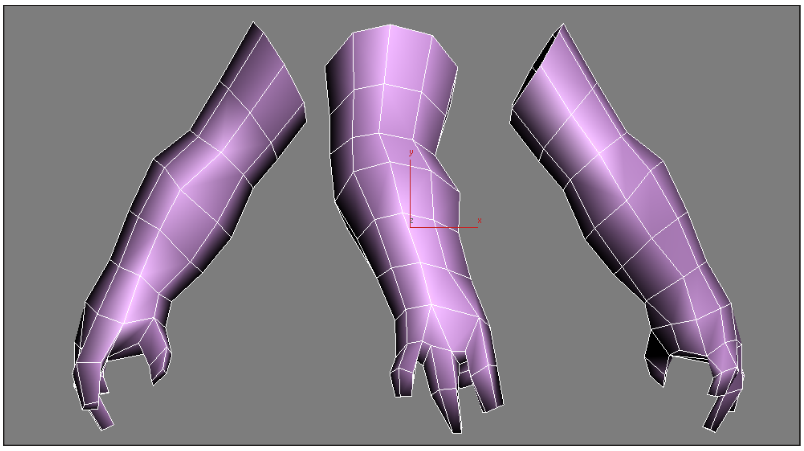
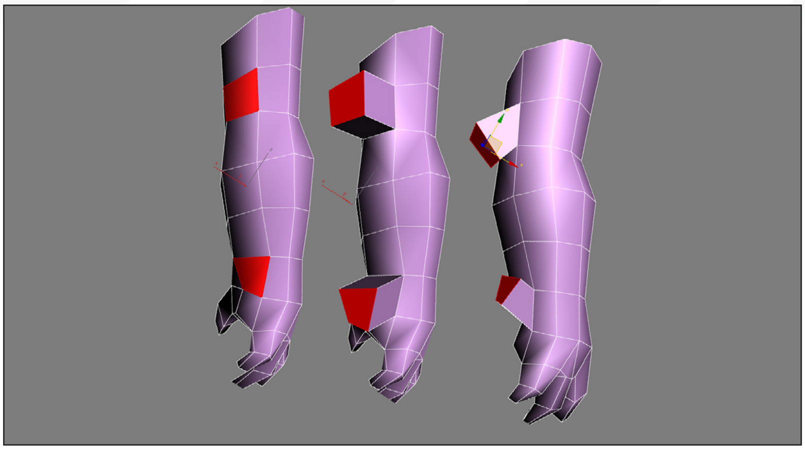


Fig 44

44. Here is a preview of the arm from several angles (**Fig.44**).

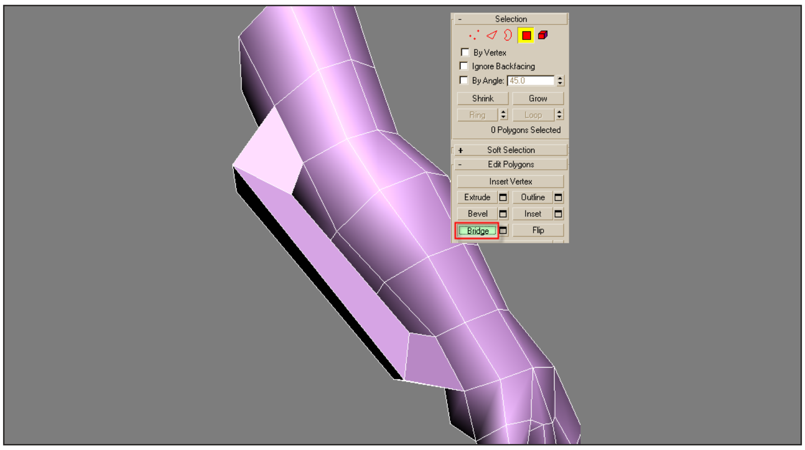
45. We're now at the final stage of the base mesh creation in Max, where we're going to flesh out his arms. To keep things simple, just select the two faces, as shown in **Fig.45**, extrude them, and then move them slightly to be more face-to-face.

Fig 45



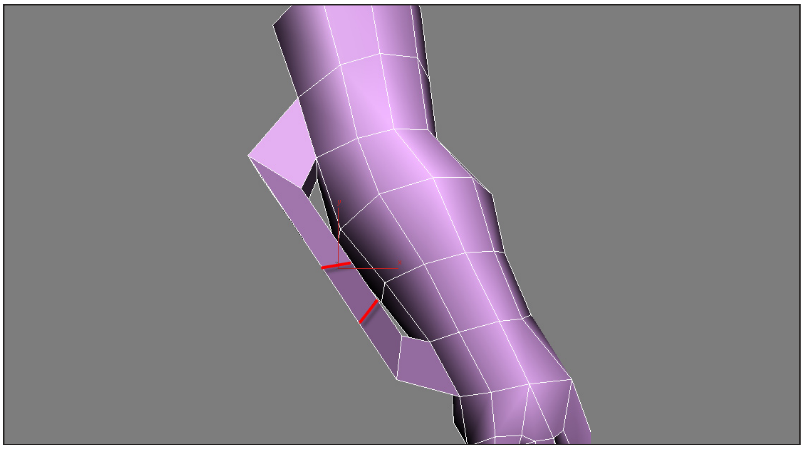
46. Keep the two faces selected and then press the Bridge button. This will connect both sides and close the object (**Fig.46**).

Fig 46



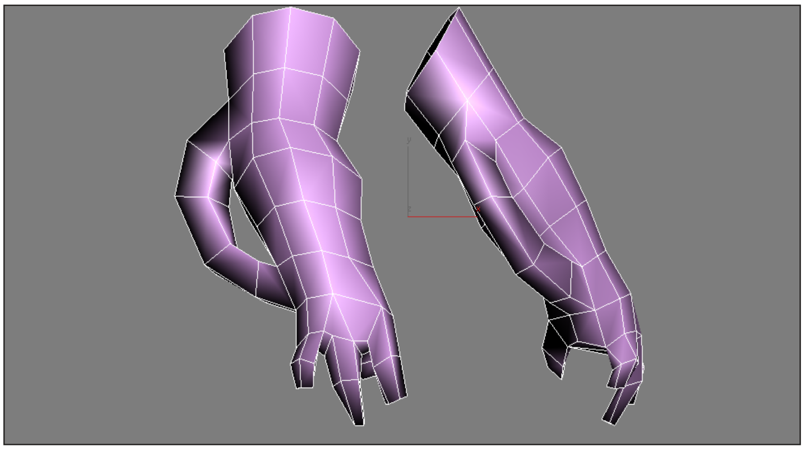
47. We'll now add some more cuts to push the new arm element a little further out (**Fig.47**).

Fig 47



48. As you've done several times now, push the vertices a little to get a more rounded shape (**Fig.48**).

Fig 48



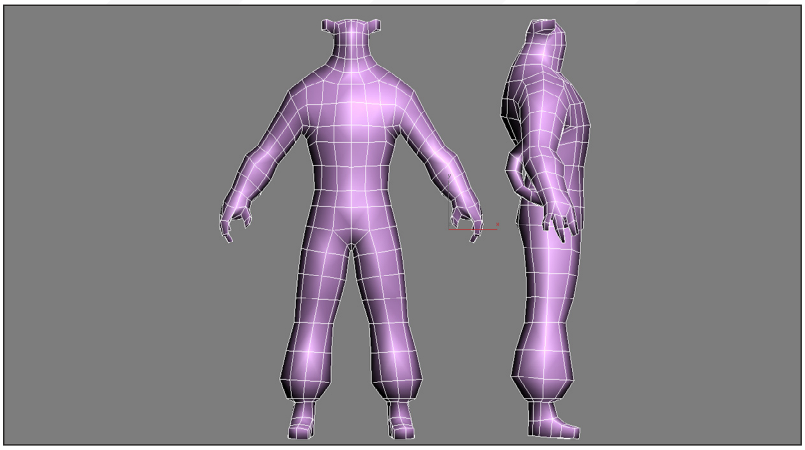


Fig 49

49. And finally, our base mesh is done. It's now time to take it into ZBrush for the sculpting part of the concept creation (**Fig.49**).

PART 1B – BASIC SCULPTING

In this second part of chapter one, we are going to see how to come up with more interesting shape and volumes in ZBrush.

Fig 50

50. First of all, import your base mesh into ZBrush. There are two different ways to do this: you can either use the import option when launching ZBrush, as shown in **Fig.50**, or you press Escape and then, under the Tool tab, click Import.

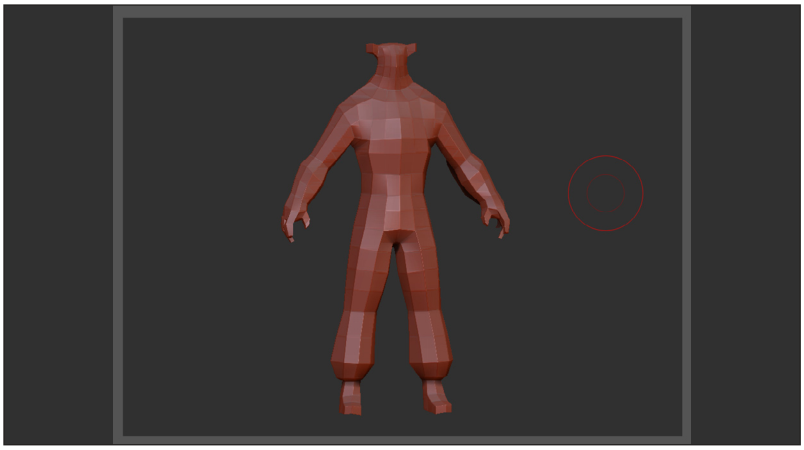


Fig 51

51. Here is a preview of what you will see on your ZBrush canvas when you import your base mesh (**Fig.51**).

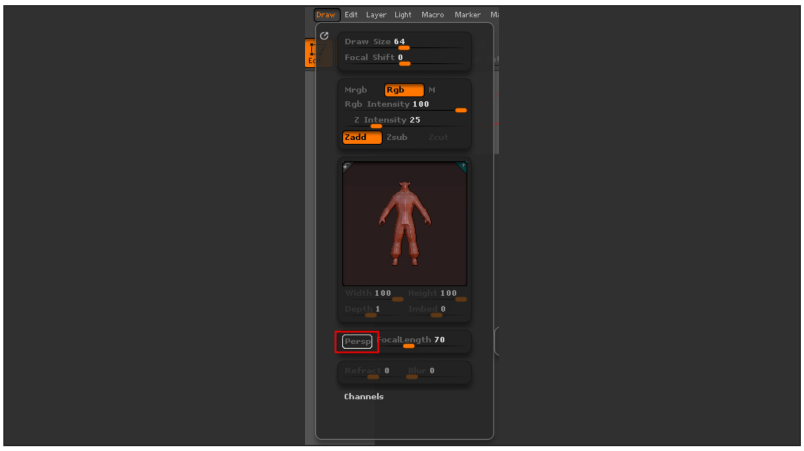
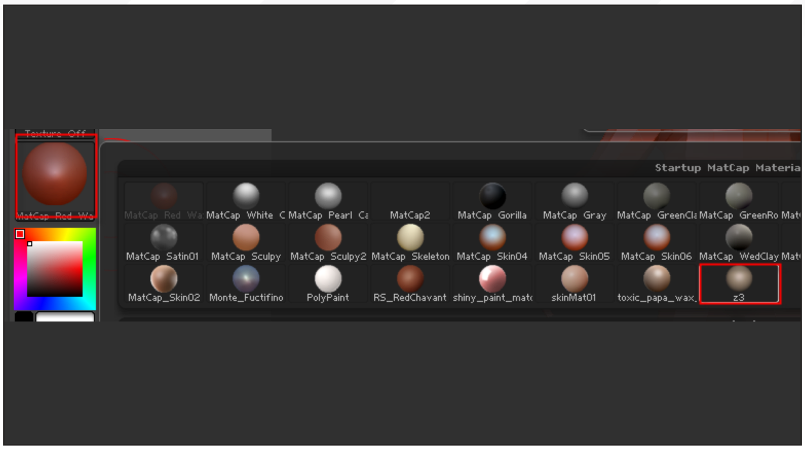


Fig 52

52. When you sculpt, it's important to keep 3D world camera constraints, in order to be sure that you have the right proportions if you decide to then import your final model into another 3D package, like 3ds Max, to make some renders. You have two options: you can go to the Draw tab and press Persp, or just press just the P hotkey (**Fig.53**).

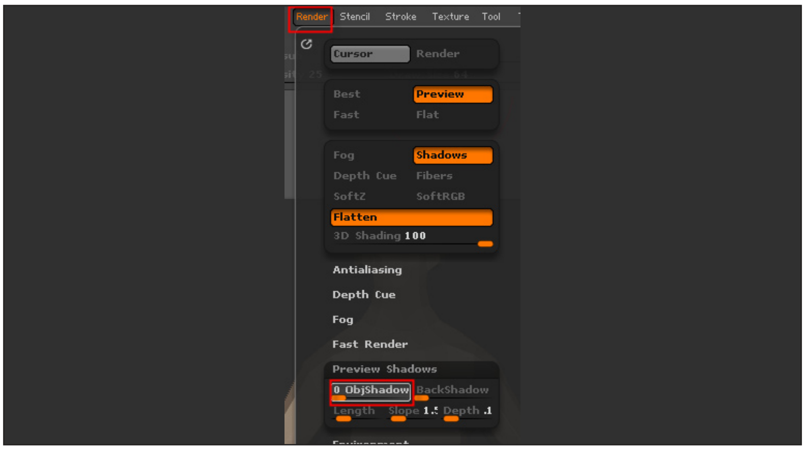
53. On the left of the screen, you should see a red ball which represents the Material Editor in ZBrush. Feel free to try some of them out to get a better idea of how it works. I usually use a very simple one, close to a standard blinn material in 3ds Max (**Fig.53**).

Fig 53



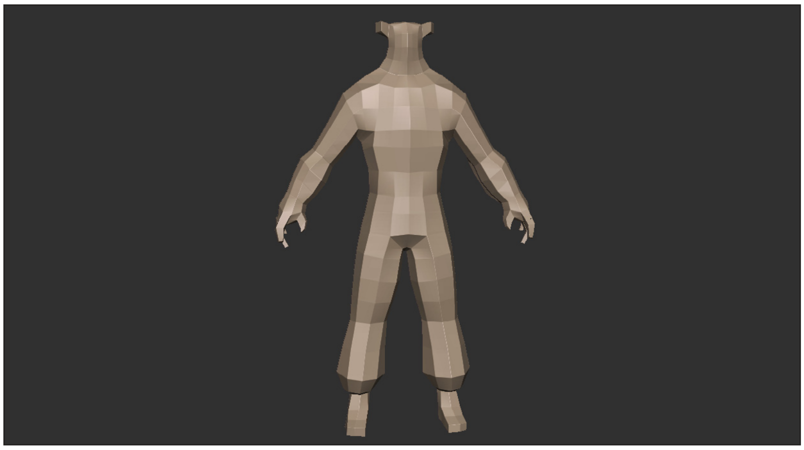
54. In ZBrush, you are able to preview some real time shadows, like screen space Ambient Occlusion. This can be pretty useful when it's time to make some renders, but for the brut sculpting it's nice to disable this option. You will have more facilities to sculpt some difficult areas, like under the shoulders. To disable shadows go to the Render tab, and under Preview Shadows slide the ObjShadow value to 0 (**Fig.54**).

Fig 54



55. Here is how our base mesh should currently look on the ZBrush canvas (**Fig.55**).

Fig 55



56. In the Tool tab, under Geometry, press Divide twice to add more subdivision to your model (**Fig.56**).

Fig 56

Fig 57

57. We can activate the symmetry now to save some time, so go to the Transform tab, press Activate Symmetry, and choose the axis you wish to use for the symmetry. You can just choose X (**Fig.57**).

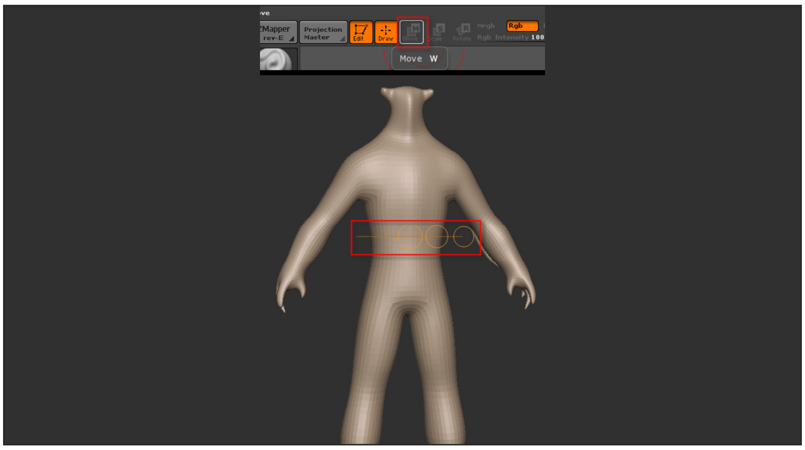


Fig 58

58. We are now going to create some selection sets, with thanks to ZBrush's Transpose function. This allows us to sculpt some difficult areas with many facilities. First, press the Move button, as shown in **Fig.58**, or simply press the W hotkey.

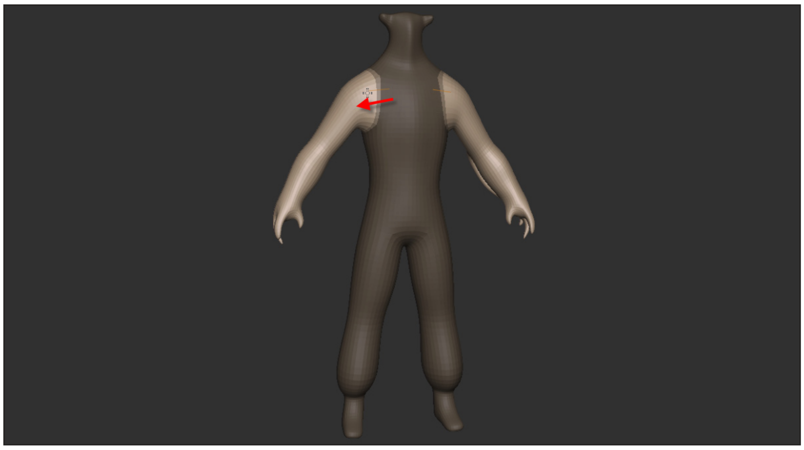


Fig 59

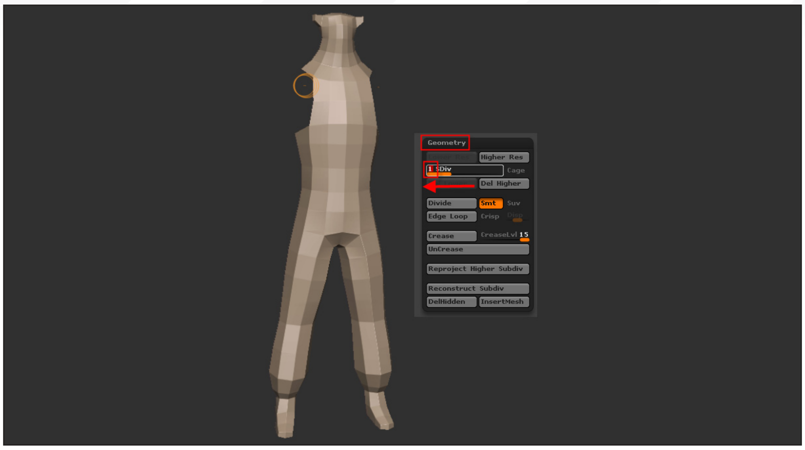
59. Pressing Ctrl, drag the orange edge from the middle of the shoulder to the beginning of the arm, as shown in **Fig.59**, with your graphics tablet (or mouse). When you have something close to what is shown in **Fig.59**, release your graphics tablet first, and then let go of the Ctrl key. The body should now be masked.

Fig 60

60. In the Tool tab, open the Masking dropdown menu and press HidePt. This will hide the part of the mesh you haven't masked. You have now the full body available on the canvas only (**Fig.60**).

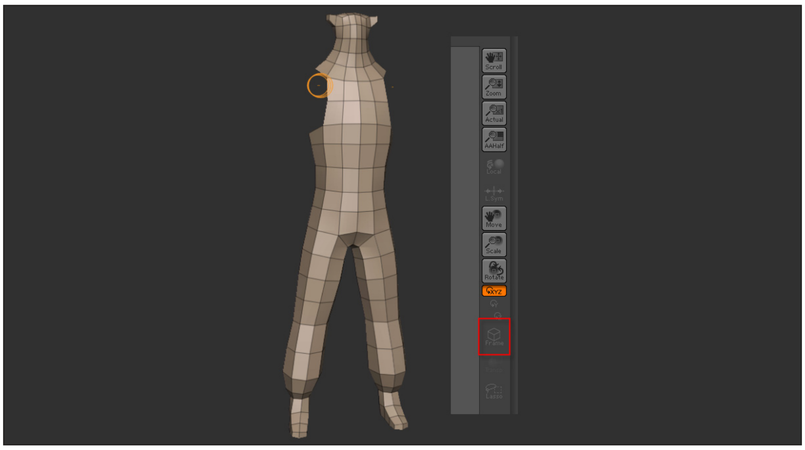
61. Go back to subdivision level 0 now (**Fig.61**).

Fig 61



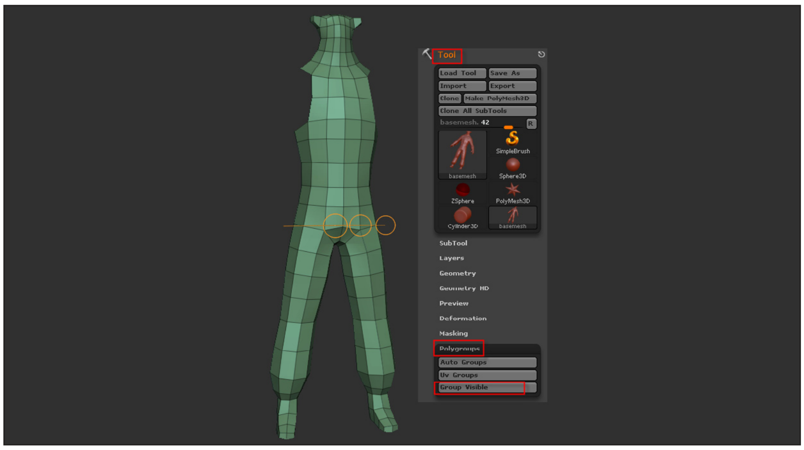
62. Press the Frame Button on the right tab. This will display the wire of your object (**Fig.62**).

Fig 62



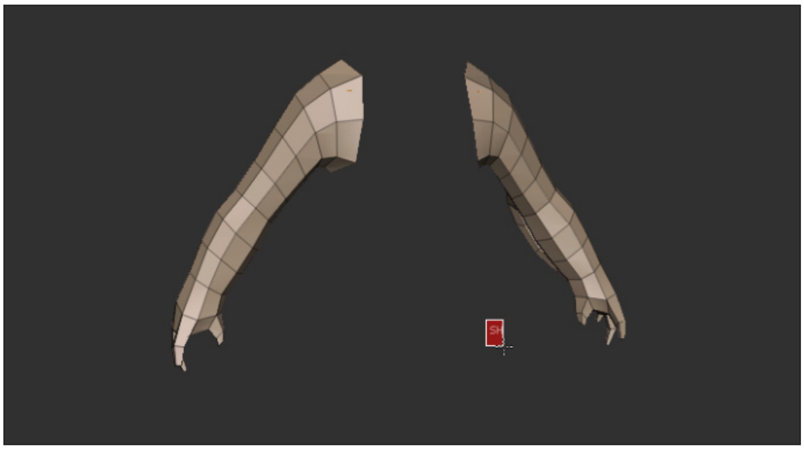
63. Open the Polygroups dropdown menu and select Group Visible; this option will tint the visible selection with a basic color (**Fig.63**). Notice that the color will only be visible if the Frame button is enabled.

Fig 63



64. Inverse the visible object part. To do this, keep pressing Ctrl + Shift, and drag a green square selection onto the canvas. Release Shift (the square should then become red), release the graphics tablet, and finally release Ctrl. You can now see arms instead of the body (**Fig.64**).

Fig 64



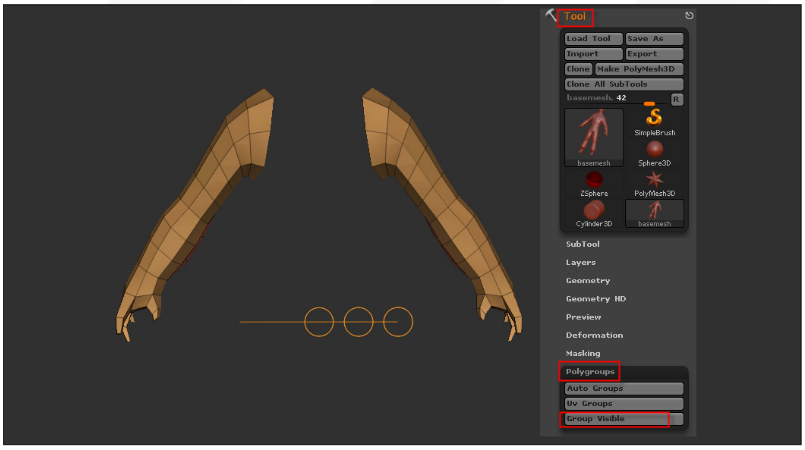


Fig 65

65. Do the same as before now: select Group Visible once again – a different color is applied to the arms (**Fig.65**).

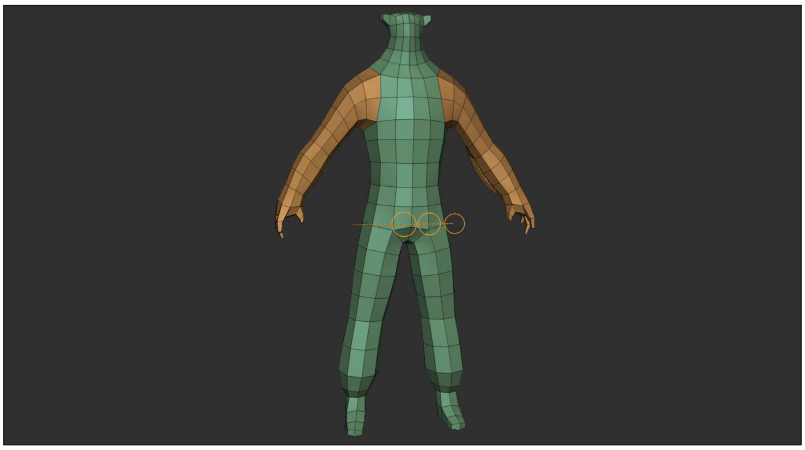


Fig 66

66. You can now display the full character by pressing Ctrl + Shift + clicking on the canvas (not on the object) (**Fig.66**).

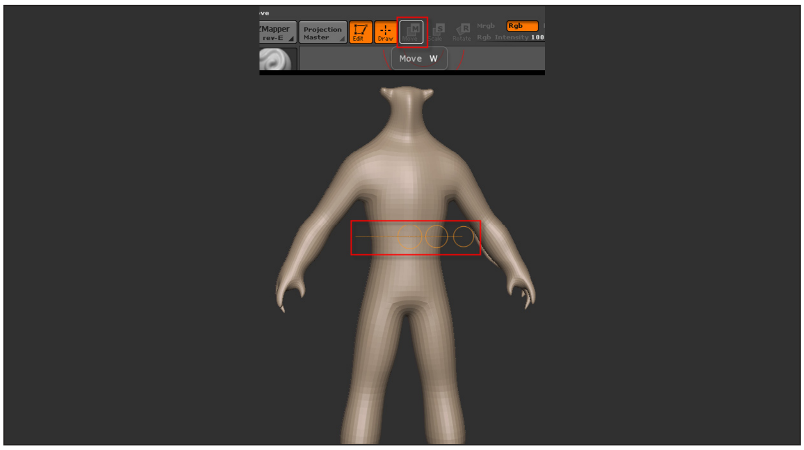


Fig 67

67. We are now going to select the last part of the character. Check that you are still in Move (W) mode. Uncheck the Frame button to hide the colors (**Fig.67**).

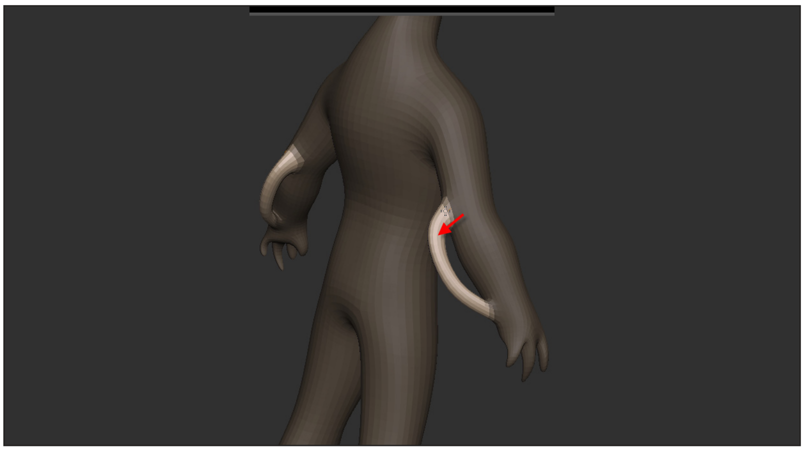


Fig 68

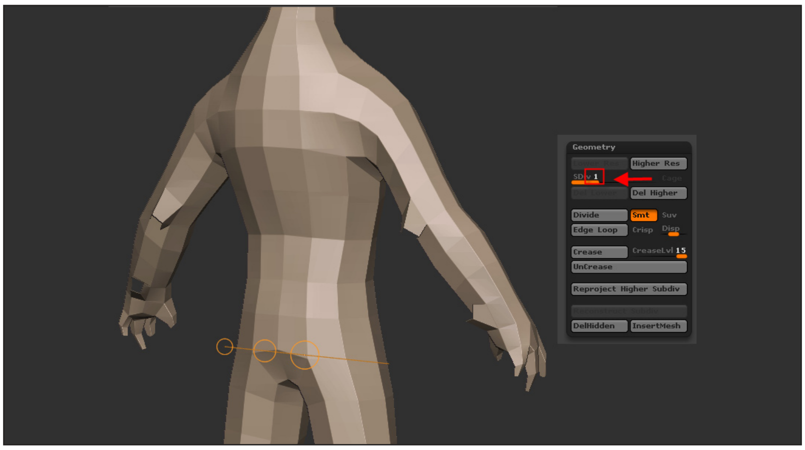
68. In the exact same way as before (see step 59) create a mask, this time including the body and arms, but not the extra arm element that we added (**Fig.68**).

69. Press HidePt to hide the extra element on the arms (**Fig.69**).

Fig 69

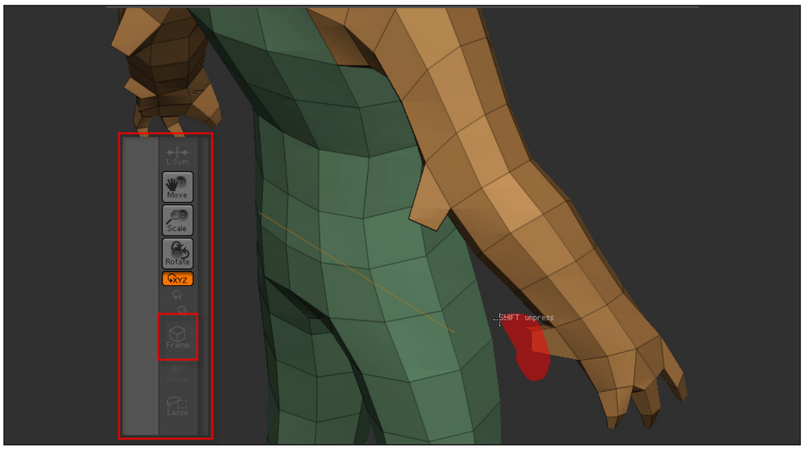
70. Go back to the subdivision level 0, the polygonal display (**Fig.70**).

Fig 70



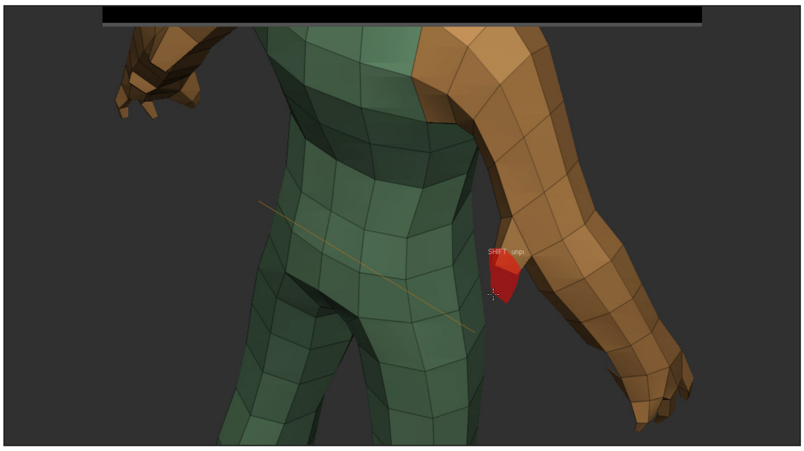
71. Enable the Frame button again to see the selection sets. Now we are going to hide the remaining polygons which don't belong to the arms. Select the Lasso mode selection, just under the Frame button. Keep pressing Ctrl + Shift, and drag a green circle around the extra polygon. Then release Shift (the circle becomes red), release your graphics tablet, and finally release Ctrl. The polygons will disappear (**Fig.71**).

Fig 71



72. Do the same for the other protruding element that we want to hide (**Fig.72**).

Fig 72



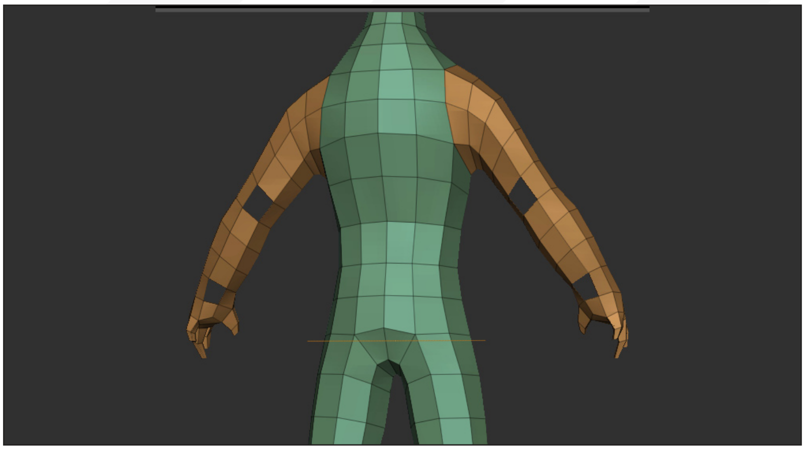


Fig 73

73. You'll need to do the ones on the left arm, too. Unfortunately you can't use the symmetry function for this, which is why we must do both sides one at a time (**Fig.73**).

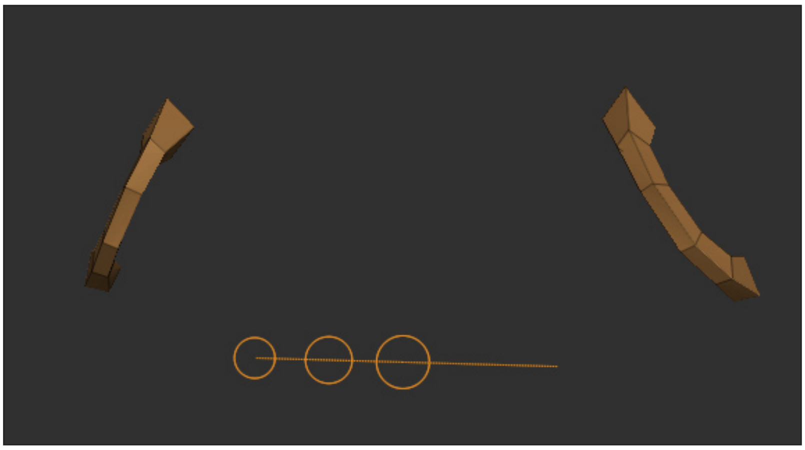


Fig 74

74. Now invert the selection as explained before (see step 64) to display only the extra arm element's polygons (**Fig.74**).

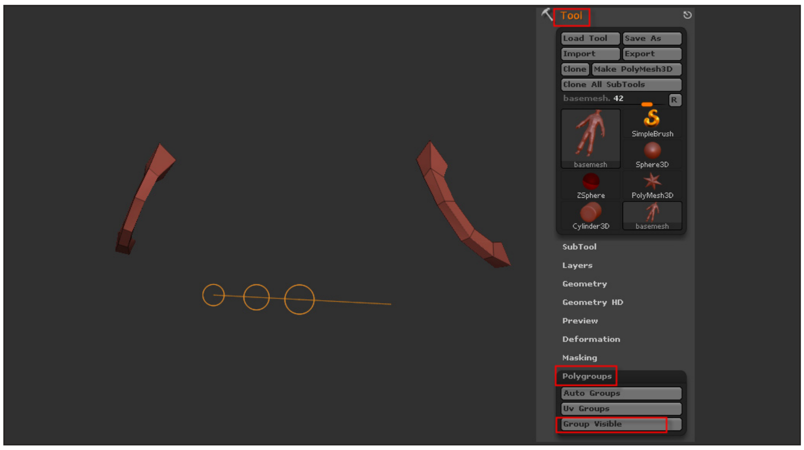


Fig 75

75. Create the last selection set by pressing Group Visible once again (**Fig.75**).

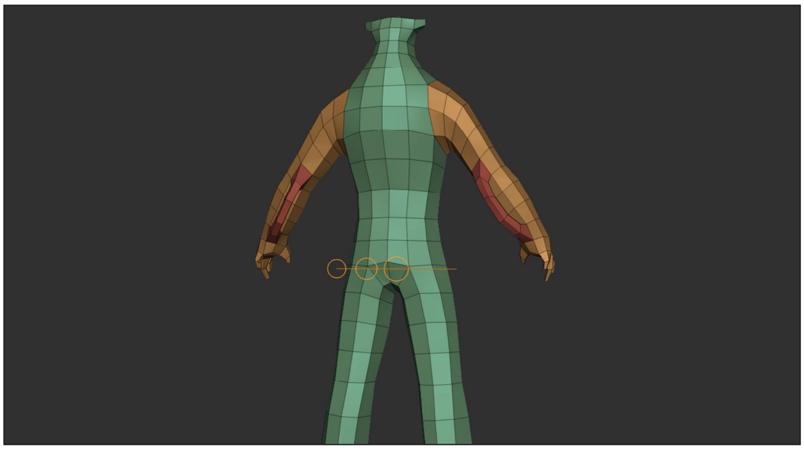


Fig 76

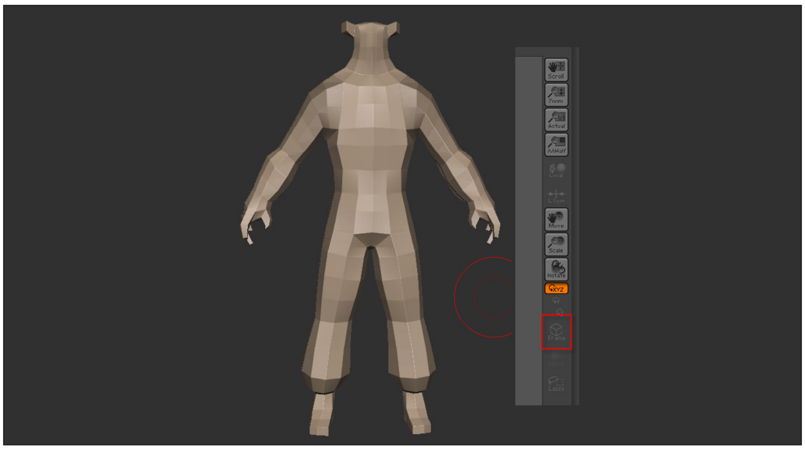
76. Unhide everything by pressing Ctrl + Shift and clicking in the canvas. You can now see three different colors, and therefore your three different selection sets. Now, to isolate one of the selection sets, you just have to press Ctrl + Shift and click on one on the colored parts. This will hide the ones you haven't clicked on. Simply Ctrl + Shift and click on the canvas (not on the character) to display the entire mesh (**Fig.76**).

77. With the selection sets done now, it's time now to start sculpting to come up with a better shape for our character concept. On the left of the screen, click on the Standard brush button. A pop up will appears – select the Move brush. Before sculpting, we are going to move some vertices – like we can do in 3ds Max – with the soft selection (**Fig.77**).

Fig 77

78. To have a better preview of your shape, disable Frame to remove the colors (**Fig.78**).

Fig 78

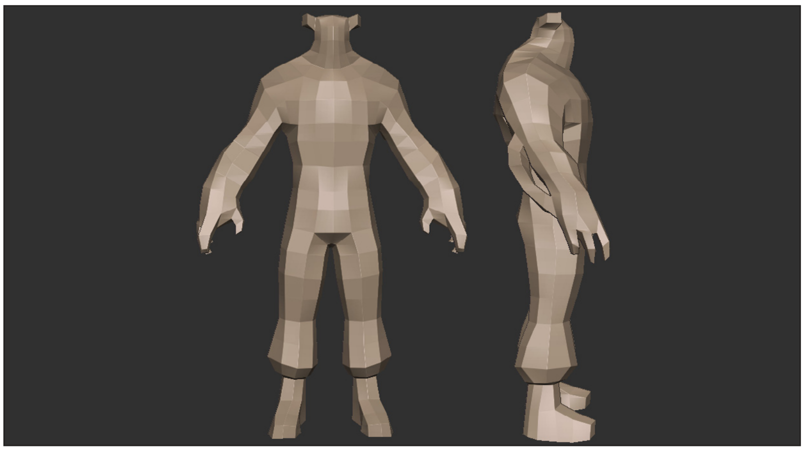


79. Here is a brief introduction with the brush parameters on the top. Select Draw mode when you are ready to sculpt, you can then change the size and the intensity of the brush by sliding the value on the right. Notice that you can also display these options by right-clicking on the canvas; it's pretty useful when you want to limit pen tablet movements (**Fig.79**).

Fig 79

80. With move brush selected, move some areas to get a stronger shape (**Fig.80**).

Fig 80



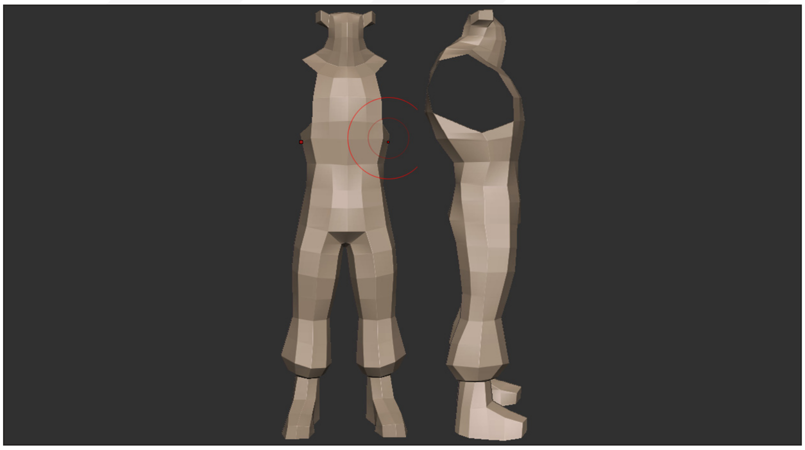


Fig 81

81. Don't forget to use the selection sets to move vertices easily without moving unconcerned parts, for example under the shoulder (see step 76) (**Fig.81**).

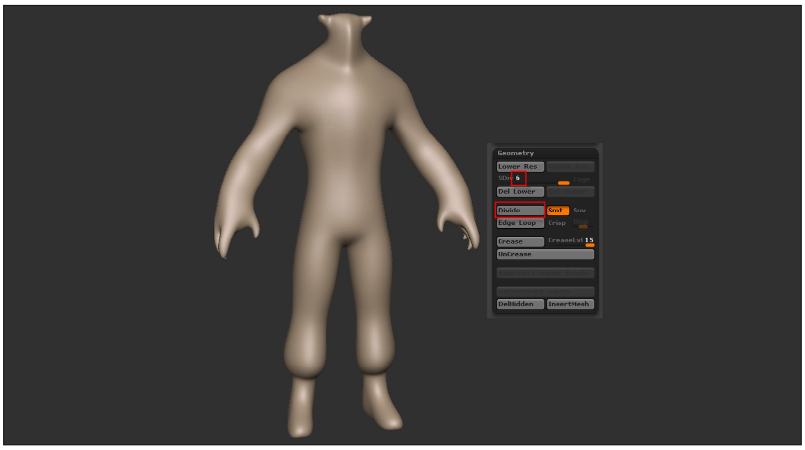


Fig 82

82. With the main shape defined, we are going to push the volumes a little more to add some definition. Keep in mind that it's up to you to decide the number of subdivisions – you just to be comfortable with it. Try to keep the Active Points number under a million polygons; we are working roughly for now. For this example, divide your model 6 times (**Fig.82**).

Fig 83

83. The following brushes will be the ones we are going to use during the concept sculpting process. The Inflat brush is used to push the volumes, the Clay brush is used to define the strong volumes, and Smooth to soften them (**Fig.83**).

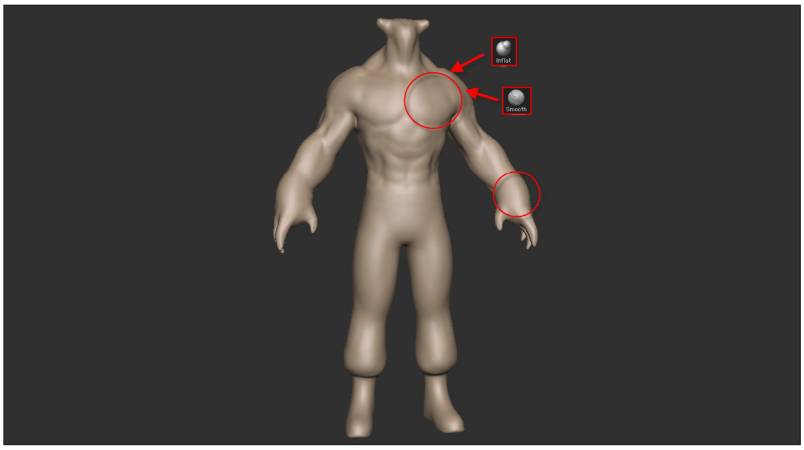
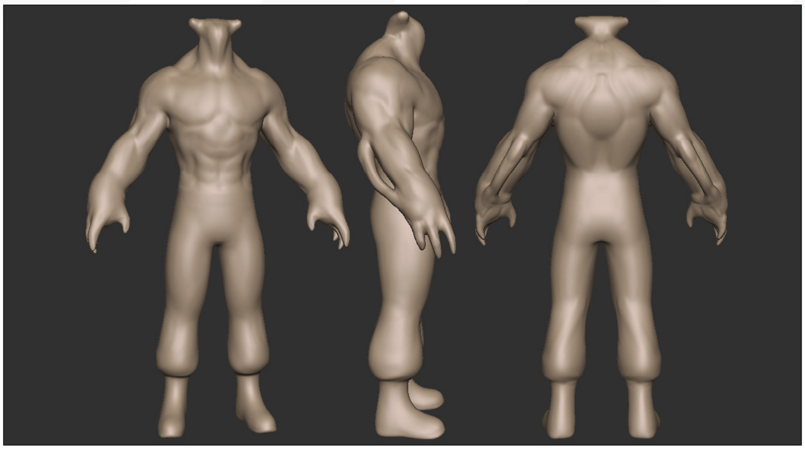


Fig 84

84. With your first attempt, try pushing the volumes to get your first intentions down, mainly using the Inflat and Smooth brushes to start with. Take your time to experiment and feel the volumes, it's still very easy to go back (**Fig.84**).

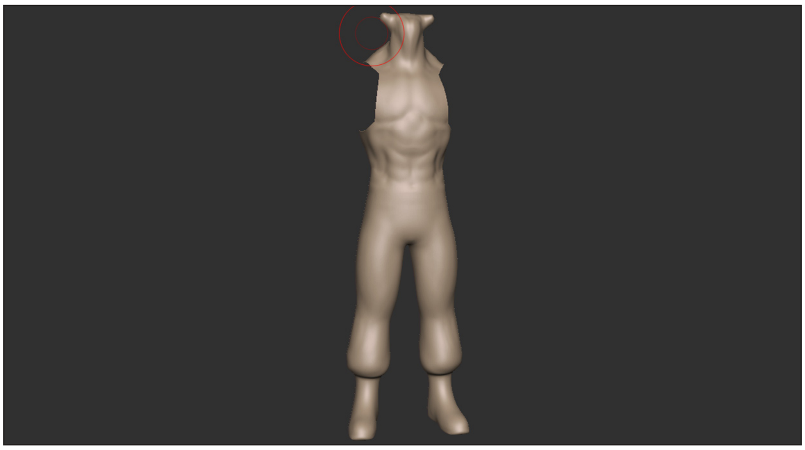
85. Here is a preview from several angles (**Fig.85**).

Fig 85



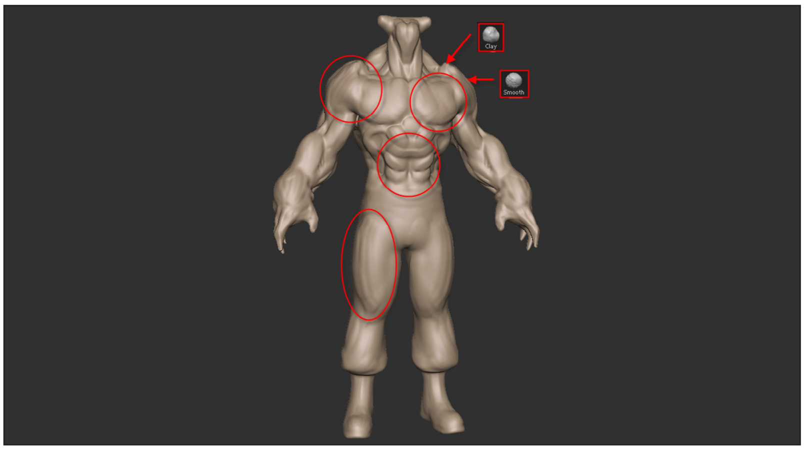
86. Once again, don't forget to use your selection sets to simplify your sculpting process (see step 76) (**Fig.86**).

Fig 86



87. In the second step, push the extreme volumes using to Clay and Smooth brushes. Keep in mind that you're not thinking about the final yet – this has to be rough, so just push out your main volumes for now. The polishing will be done later, just be satisfied with the silhouette for now (**Fig.87**).

Fig 87



88. Once again, here are previews of several angles (**Fig.88**).

Fig 88

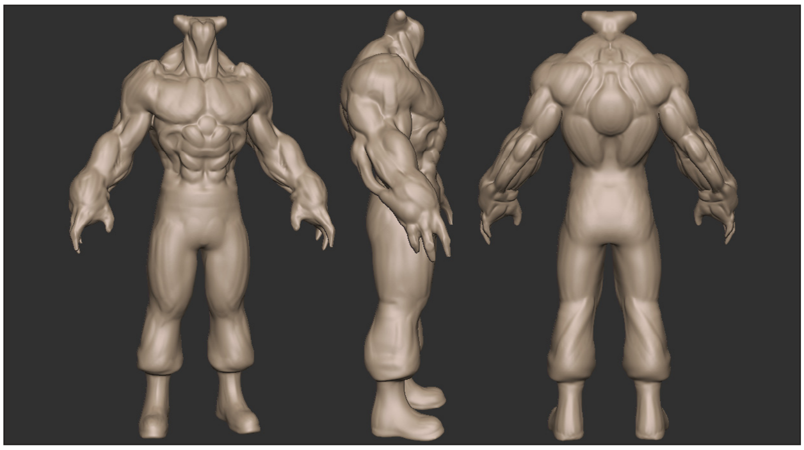


Fig 89

89. Now in this last step of the concept, we are going to use several brushes to add more definition. You will notice a brush in this set by Damien Canderle, which is a free brush available at: **http://www.pixolator.com/zbc/showthread.php?t=57944&page=6&pp=15** (**Fig.89**). This is an amazing brush for exaggerating cavities!

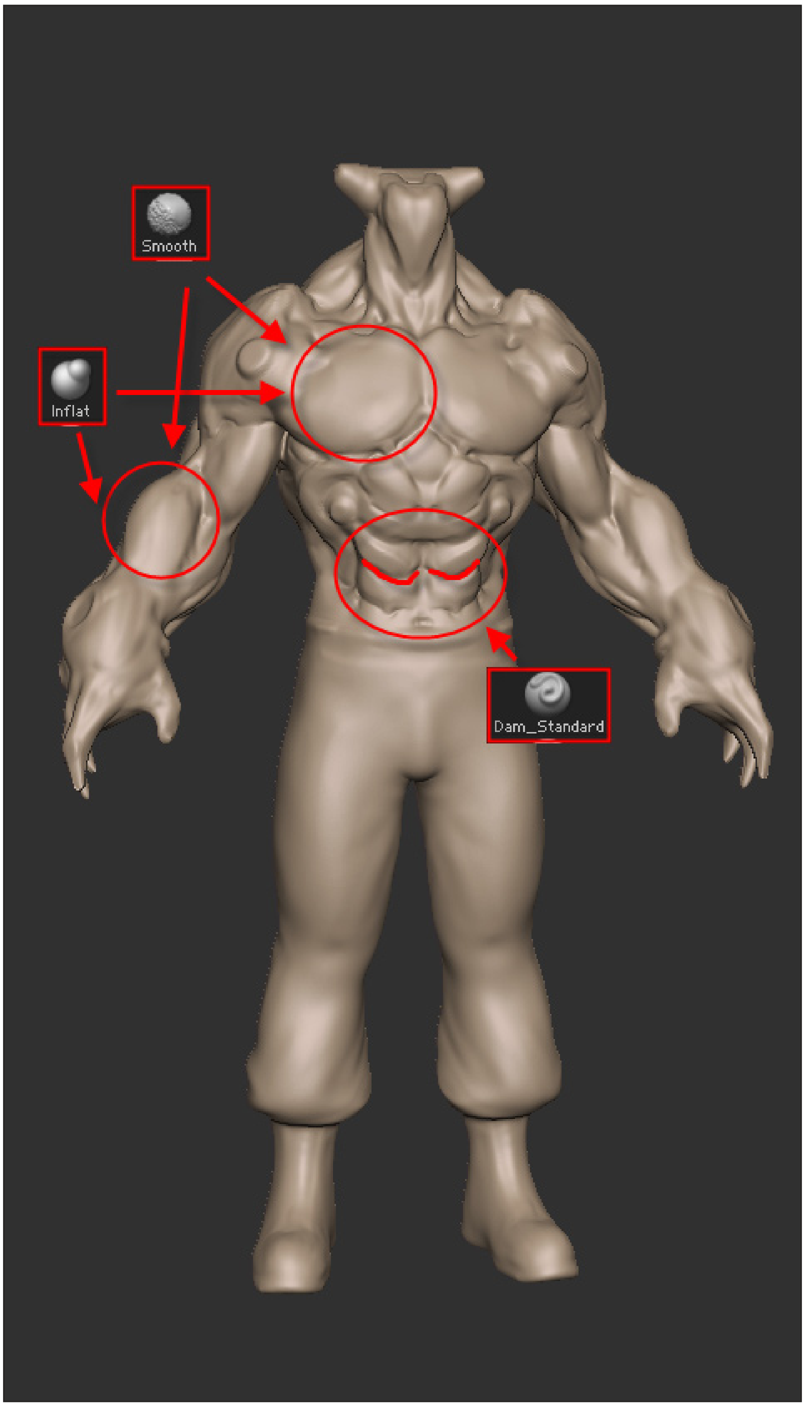


Fig 90

90. Here are some examples of these brushes in use. For the roundness of the shoulder, just use the Clay brush (with small pressure). The Dam_Standard brush is useful to force the cavities between the abs (**Fig.90**).

91. Again, here are some different angles. And this is it with the concept! We just need a solid base to be able to create and put accessories on him (**Fig.91**). Feel free to play with volumes to try different things – nothing is static in ZBrush, you have unlimited possibilities from only one simple base mesh!

Part 1c - Accessories Presentation and Final Concept

92. Here are some accessories that I have in my personal library (**Fig.92**). Sometimes, when you have some free time, it's good to make some basic elements that you can possibly use on some of your creatures or characters. They can be very useful to help you come up with a 3D concept quickly.

Fig.91

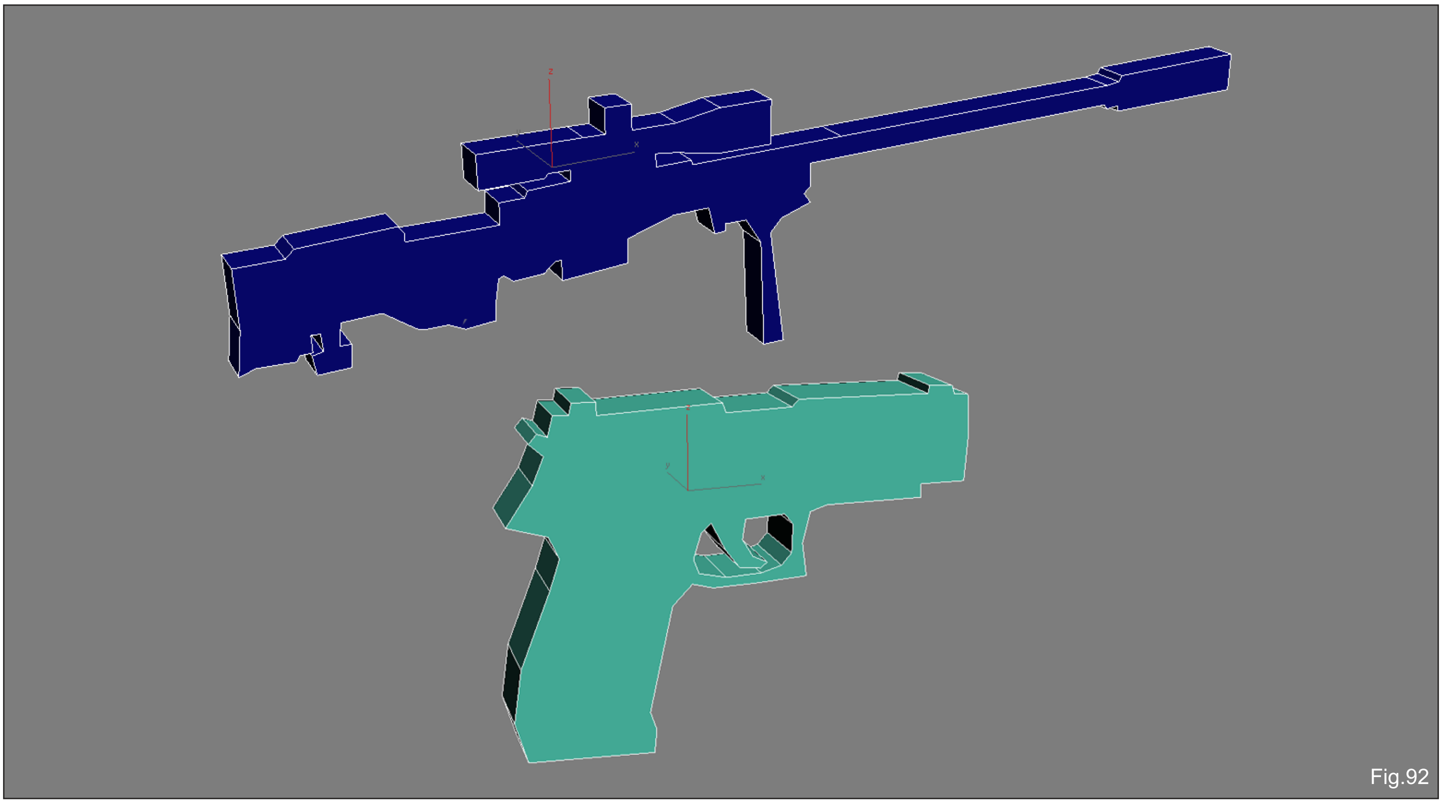


Fig.92

93. For the accessories that I don't have in my library, I create a rough prototype from a picture. I will explain the technique used for this process in Chapter 5 of this series (**Fig.93**).

94. Here is the concept after placing in some rough objects. Please don't hesitate to place some simple boxes into your concept – it's just the silhouette that is important at this stage. The preview in **Fig.94** has been done in 3ds Max 2010, with real time shadows in the viewport; it's a very nice function to properly pre-visualize objects and volumes!

That's all for Part 1, in the following chapters we will see how to create and polish the different elements presented in the concept design.

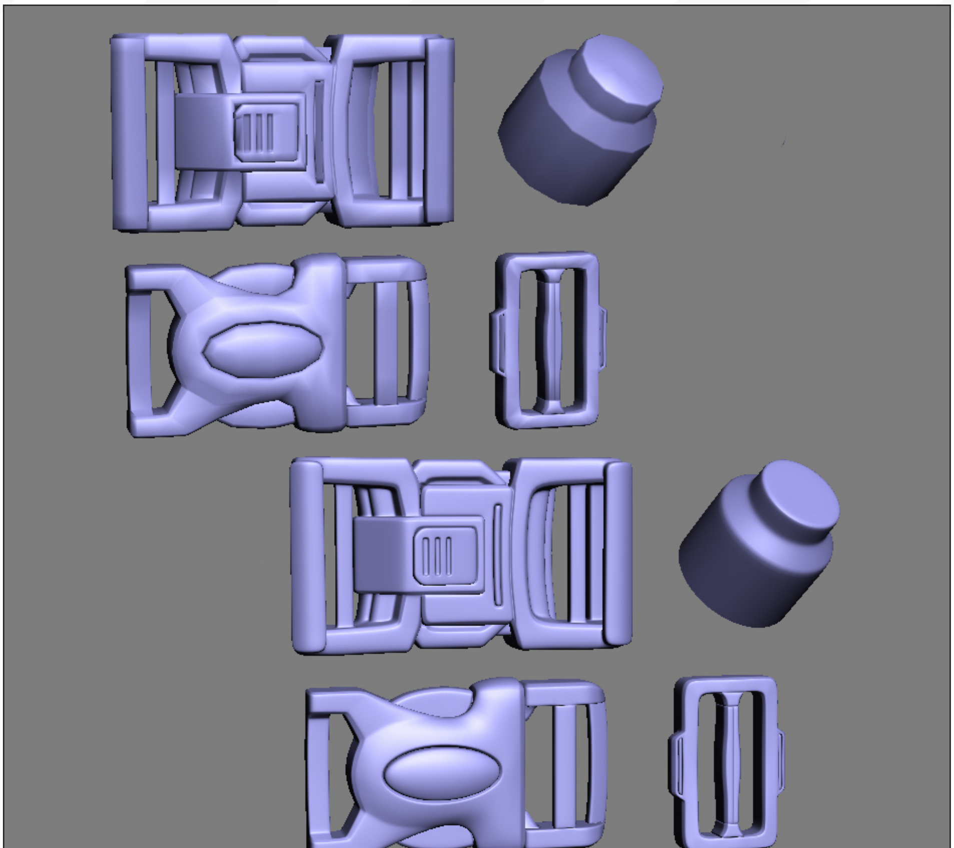


Fig.93

Fig.94

chapter 02

Shoes (ZBrush Plastic Sculpting)

Chapter 02 - Shoes (ZBrush Plastic Sculpting)

Software Used: ZBrush, 3ds Max, Silo, and Photoshop

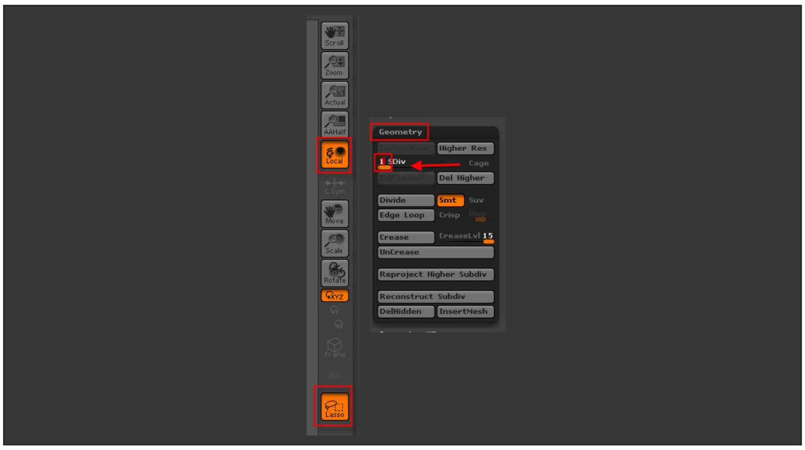
Introduction

In the following chapter, you will see the step by step progress used to create a shoe from the concept shown in chapter I.

Fig 01

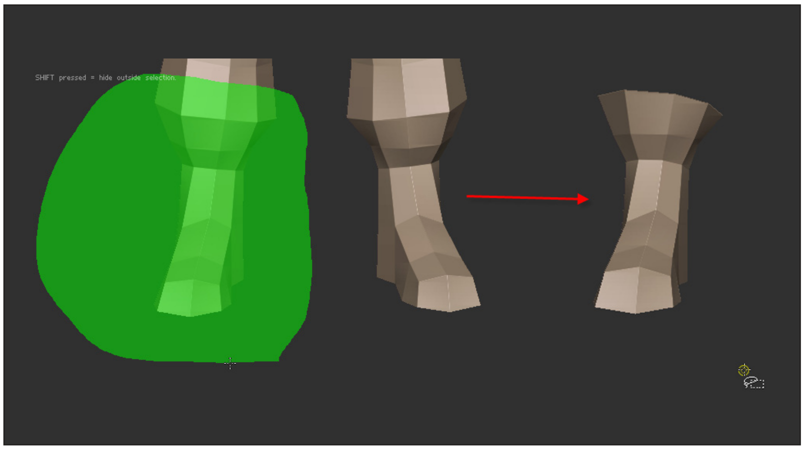
1. From the concept created in Zbrush in chapter 1. (**Fig.01**)

Fig 02



2. Some preliminary parameters to check before starting anything. Enable Local: this function will allow you to rotate around the last area you sculpted on which is very useful if you want to focus on a particular area. Enable Lasso: to activate the lasso selection mode and then change the subdivision value to the lowest level. (**Fig.02**)

Fig 03



3. With Ctrl + Shift pressed, make a selection around the right foot as shown below to isolate what will become our shoe. (**Fig.03**)

Fig 04

4. Now we are going to keep only this part to make it easier to work on. So go back to the highest level of subdivision and delete the subdivision history by pressing Del Lower. Now delete the hidden mesh and finally reconstruct your foot in order to save memory while working. (**Fig.04**)

5. Go back to the highest level. (**Fig.05**)

Fig 05

6. Divide once more; it's important because we are going to use the Polypaint function which needs vertices to be able to apply color and see an acceptable result. (**Fig.06**)

Fig 06

7. On the top menu select Draw mode and disable Zadd or Zsub as we just need the color painting function. In the Tool menu on the right under Texture, press Colorize which will switch on Polypaint. (**Fig.07**)

Fig 07

8. We are going to draw a topology on the mesh so, right click and a pop up appears. Change the draw size to get something thin enough to draw lines. In the bottom left in the color box, slide the white square to select a pure color, a purple color in this example. (**Fig.08**)

Fig 08

Fig 09

9. Just draw on the mesh to get a clean wire. (**Fig.05**)

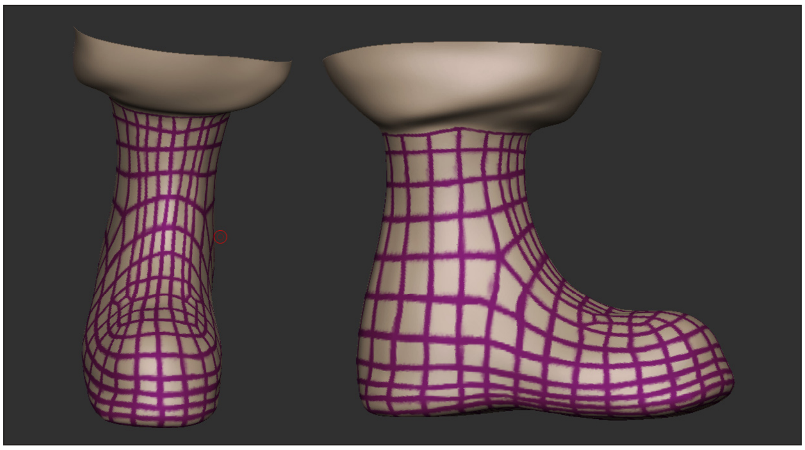


Fig 10

10. Here is a screenshot of the result. You'll see more lines at the bottom that will allow us to put more details on the sole. (**Fig.10**)

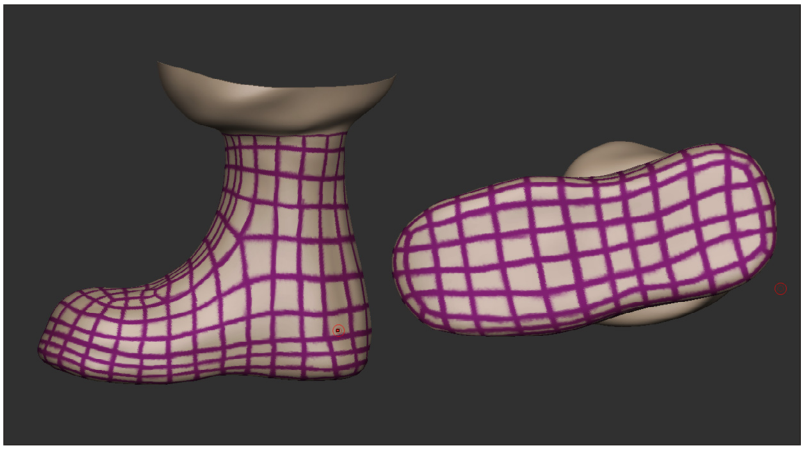


Fig 11

11. More screenshots on different angles (**Fig.11**)

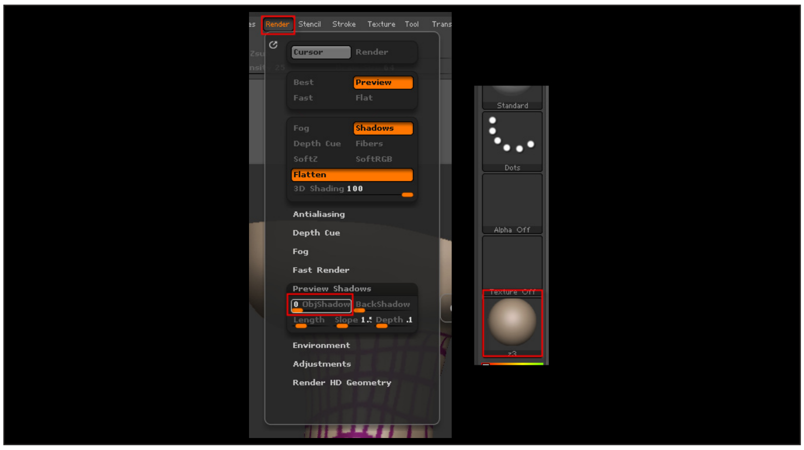
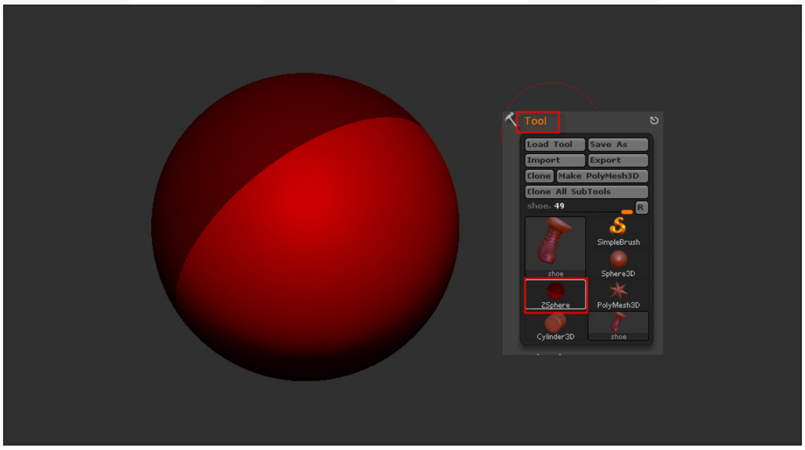


Fig 12

12. We are now going to create the new topology. Don't forget to remove the shadows and to choose the most convenient matcap for your purposes. (**Fig.12**)

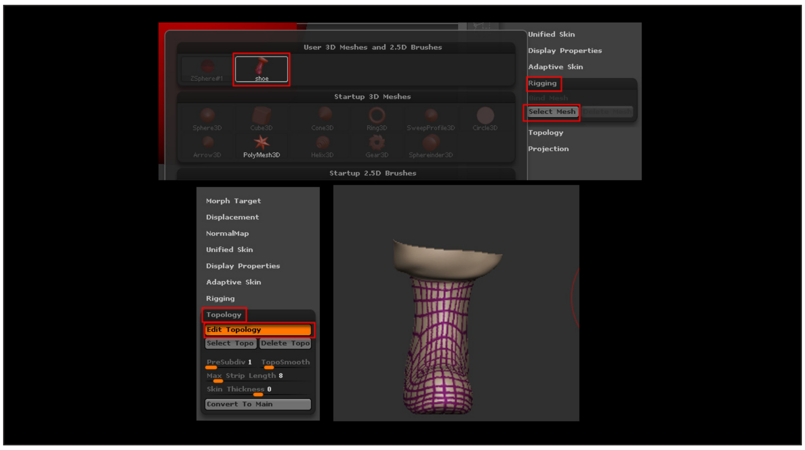
13. Create a ZSphere in the canvas by clicking on the ZSphere button under the Tool tab. (**Fig.13**)

Fig 13



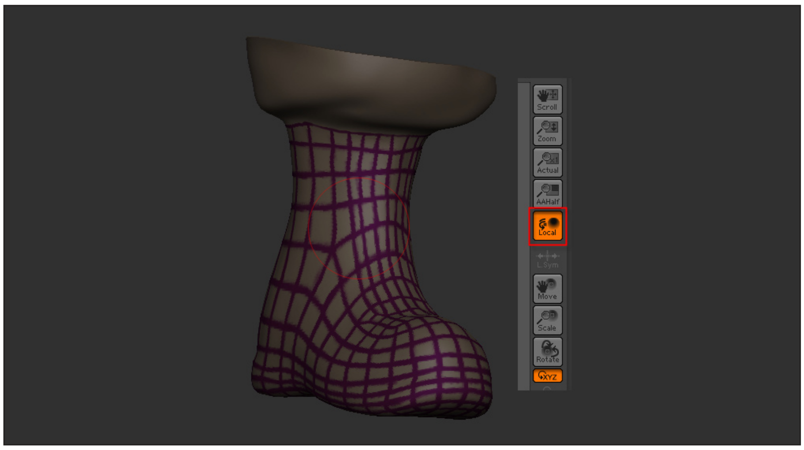
14. Still in Tool, scroll down the menu to see rigging, open it and press Select Mesh and a pop up appears. Select the shoe with the painted wire. Now open the Topology menu and press Edit Topology. The shoe now takes the place of the ZSphere in the canvas. (**Fig.14**)

Fig 14



15. Before starting anything, be sure to enable Local, as it is much easier to work with this option on. (**Fig.15**)

Fig 15

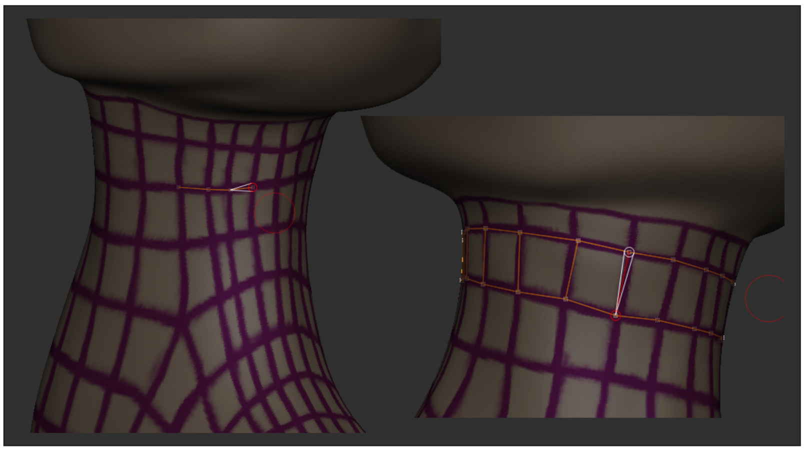


16. Let's create the wire on the top of the painted one. With Ctrl pressed, click on the mesh which will mask your object and make it become darker. It can be useful to improve the wire display. Then, left click anywhere on the mesh to start the new topology.

Some pointers about creating topology:

- If you want to create a line between two vertices, select the first one with Ctrl pressed. The node will be considered as the primary one and then click on the second one.
- To remove a vertex, Press Alt and select one. This will remove all connected lines.
- To create a new vertex on an existing line, just left click on it.(**Fig.16**)

Fig 16



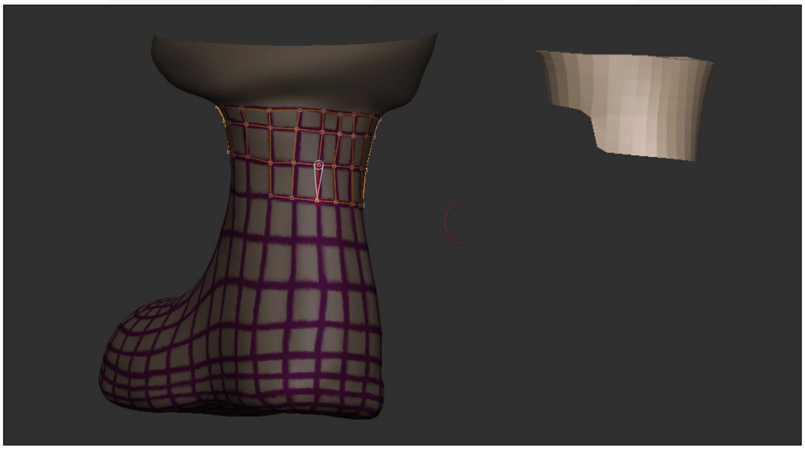


Fig 17

17. A very useful function is the ability to see a preview of the result by just pressing the A hotkey. (**Fig.17**)

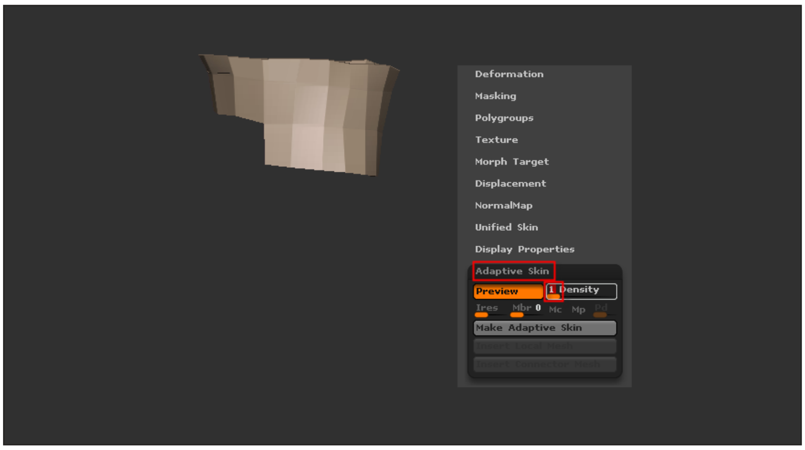


Fig 18

18. As you can see above, the preview doesn't look like the created topology, it looks subdivided. In Tool, scroll down to Adaptive Skin and change the density to 1, the preview is now right. (**Fig.18**)

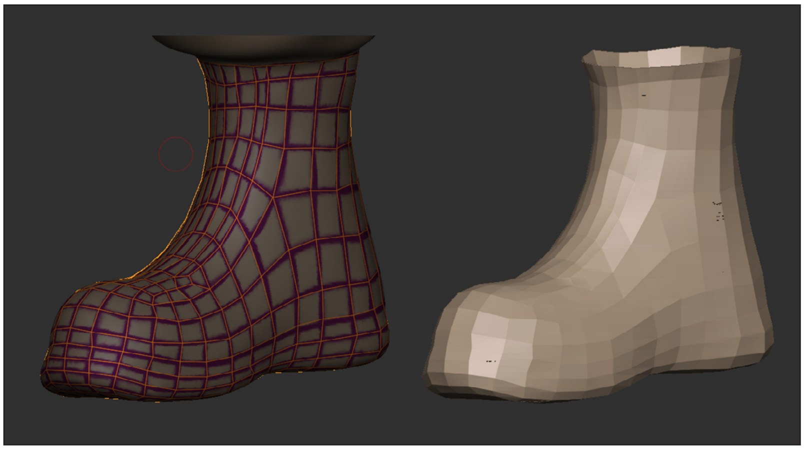


Fig 19

19. A picture with the final topology. We Polypainted it first in order to avoid mistakes and to create it faster and cleaner. (**Fig.19**)

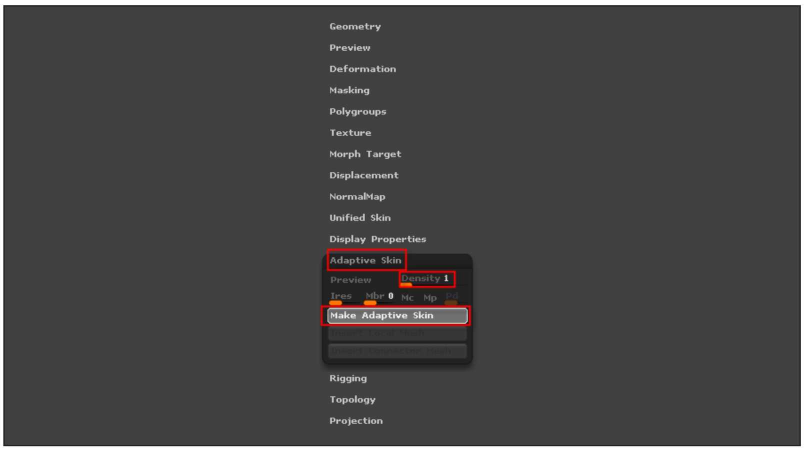
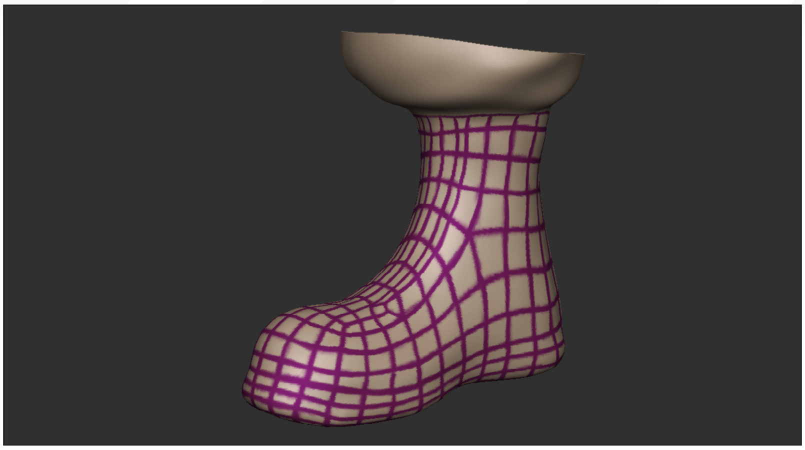


Fig 20

20. From this new wire, we are going to create and extract the corresponding mesh. Under Adaptive Skin, be sure to set the density to 1 and press Make Adaptive Skin. This will create a new tool of your mesh. (**Fig.20**)

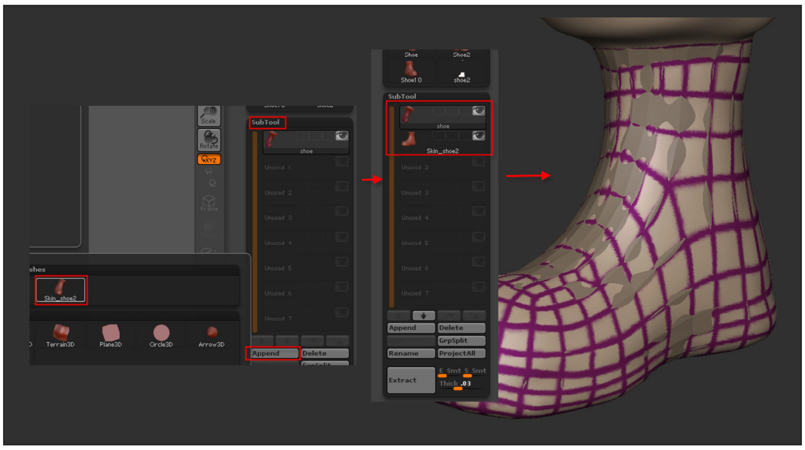
21. Go back to your original tool with the Polypainted wire. (**Fig.21**)

Fig 21



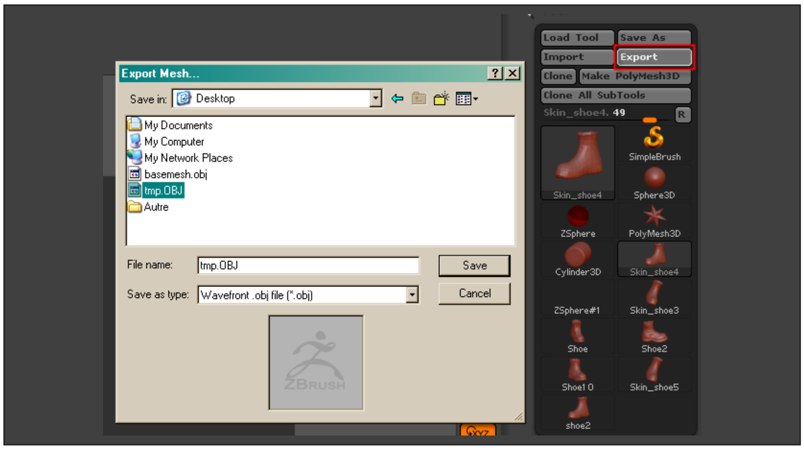
22. With Subtool menu open, click on Append and in the pop up select the mesh you've just created. We absolutely have to do that to avoid the rescaling ZBrush bug. If you export the new created mesh from its tool, the scale will be different. (**Fig.22**)

Fig 22



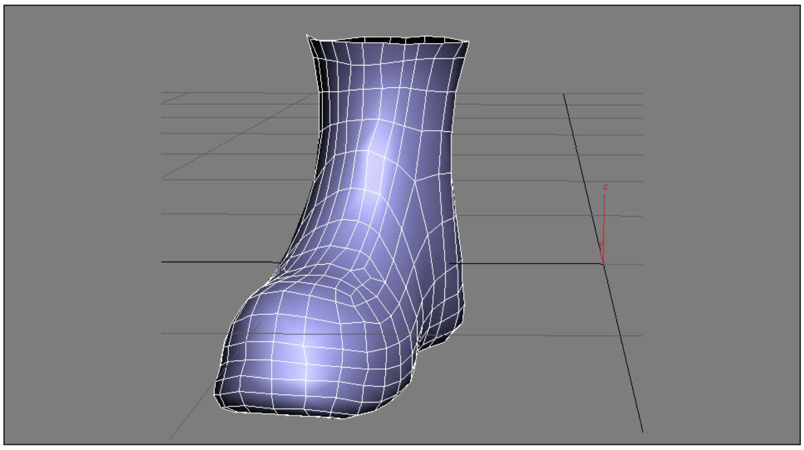
23. Select the right Subtool with your new mesh and export it. (**Fig.23**)

Fig 23



24. Import it in Max to change it a little bit. (**Fig.24**)

Fig 24



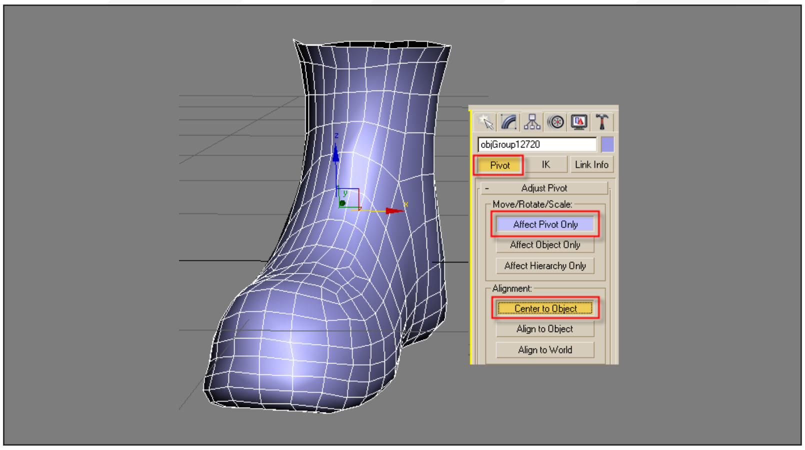


Fig 25

25. First Center the object pivot as shown below. (**Fig.25**)

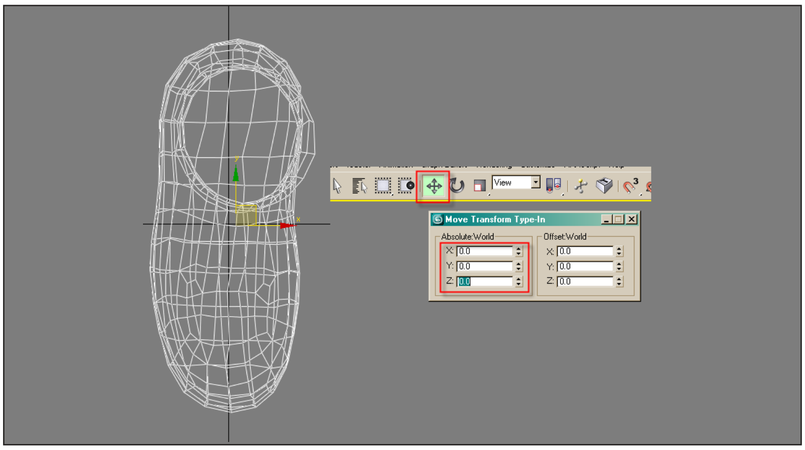


Fig 26

26. Move the shoe at the center of the scene by right clicking on the Move tool on the top bar menu and by changing the coordinates. (**Fig.26**)

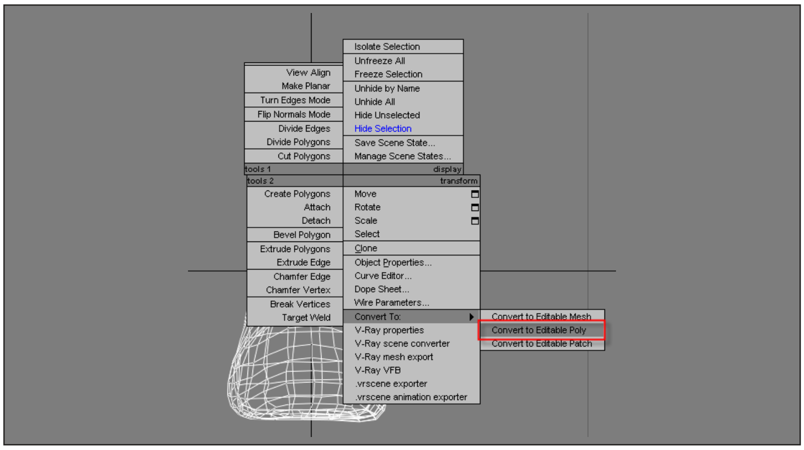


Fig 27

27. Convert it to an Editable poly to be able to make some changes on the mesh. (**Fig.276**)

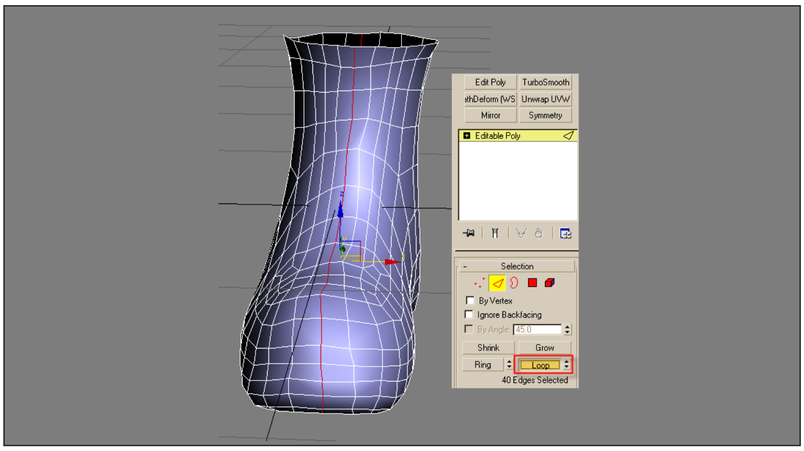
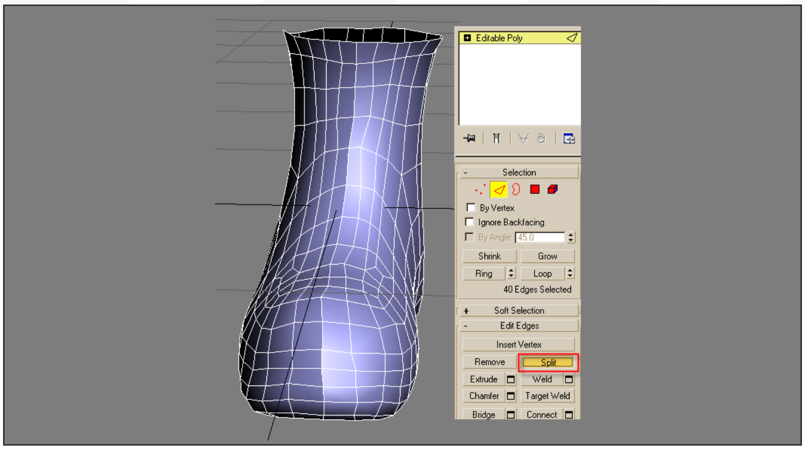


Fig 28

28. Select one edge at the middle of the mesh, press loop to select the edge loop. (**Fig.28**)

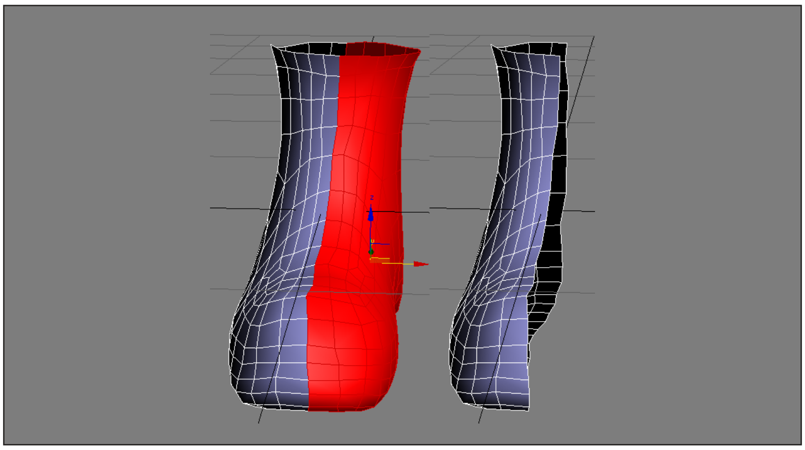
29. Press Split to disconnect both sides. (**Fig.29**)

Fig 29



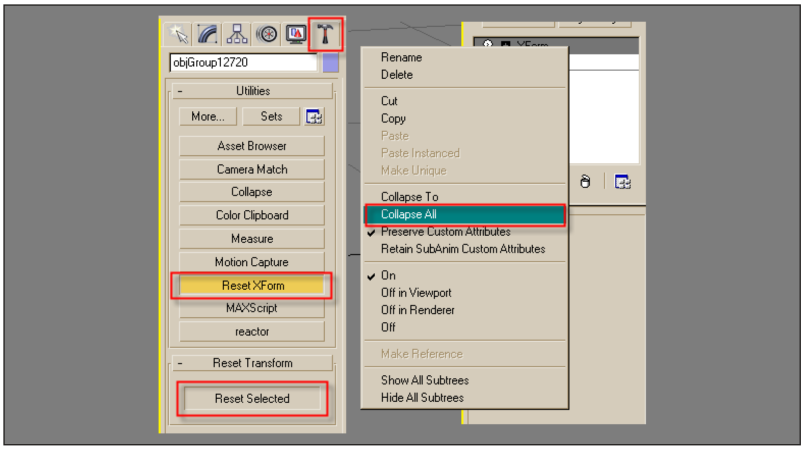
30. Select and remove the right side. (**Fig.30**)

Fig 30



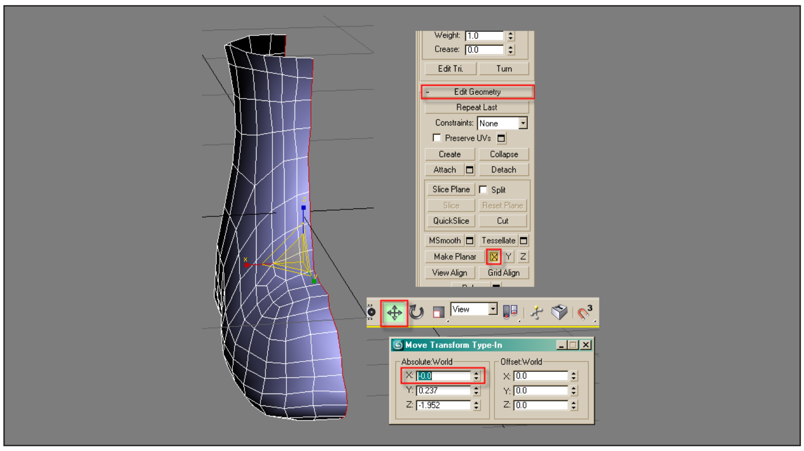
31. Under the Utility Tab press Reset Xform to remove the object history and then collapse the stack in the Modifier tab. (**Fig.31**)

Fig 31



32. Select the edge loop along the middle and make it planar along the X axis and then move it to the center of the scene by changing the X coordinate. We now have a symmetrical axis. (**Fig.32**)

Fig 32



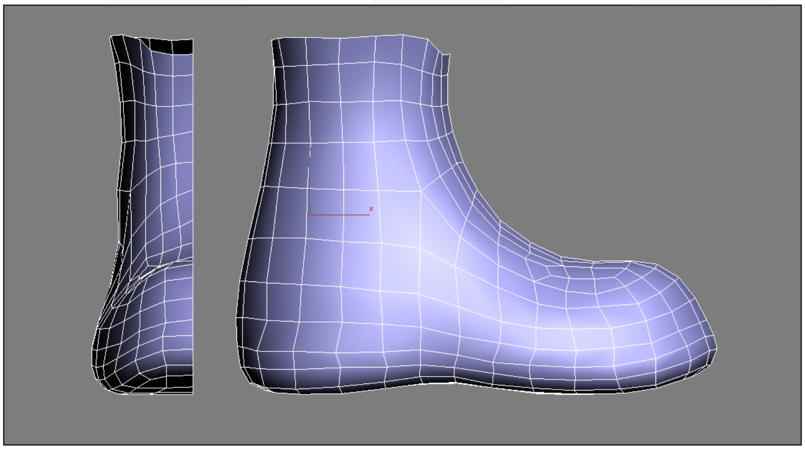


Fig 33

33. A quick preview of the shoe. (**Fig.33**)

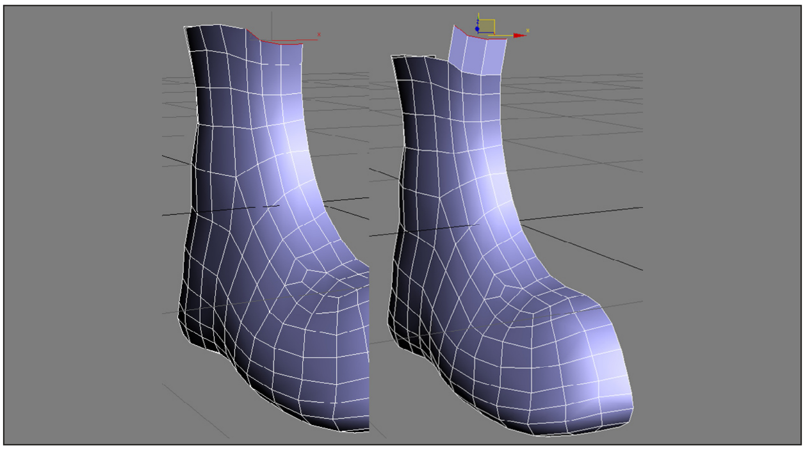


Fig 34

34. Select the 3 edges on the top and extrude them by pressing Shift and moving them at the same time. This will be the tongue of the shoe. (**Fig.34**)

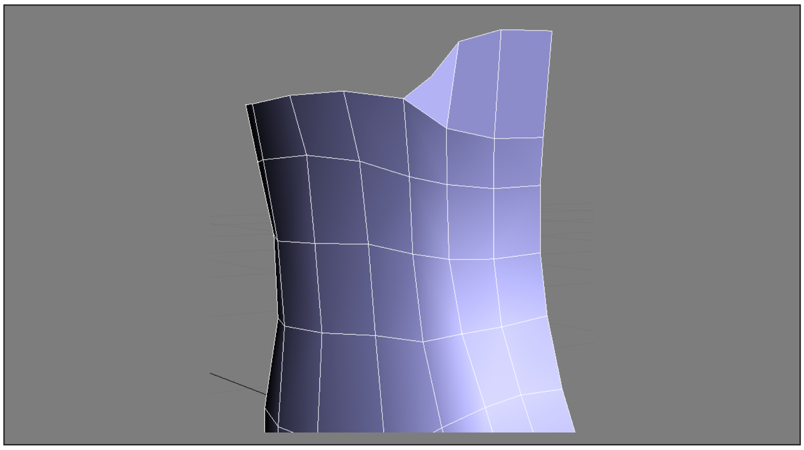


Fig 35

35. Move some vertices as shown below. (**Fig.35**)

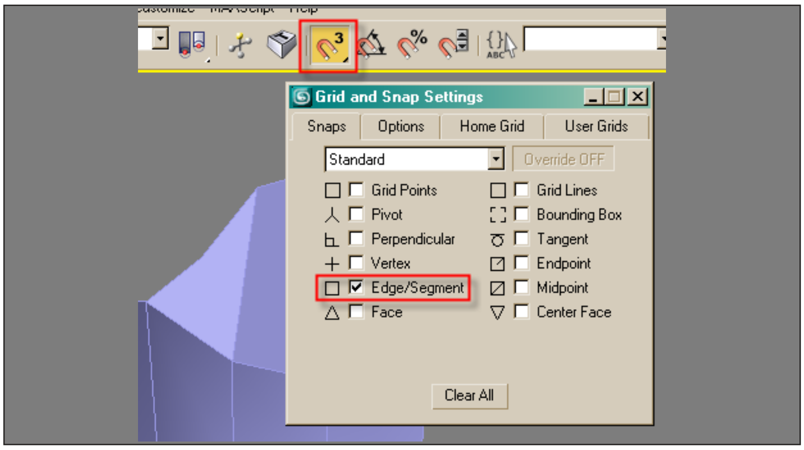
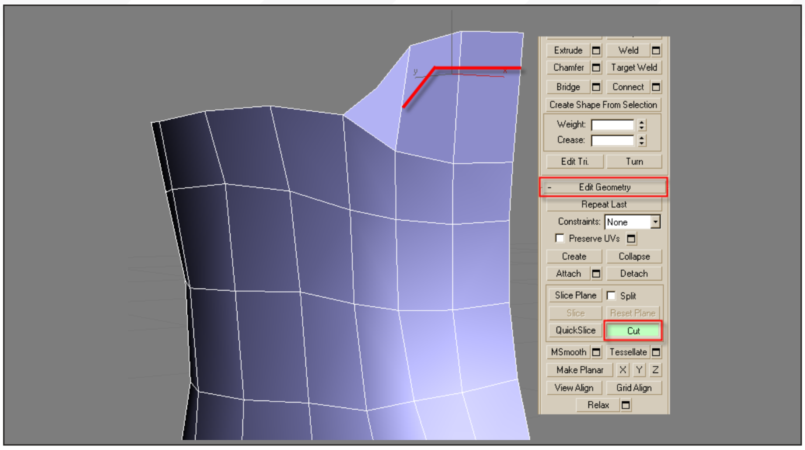


Fig 36

36. We are going to cut polygons but first change some options to make it easier. Right click on the Snap button and select Edge/ Segment only. This will auto detect edges. (**Fig.36**)

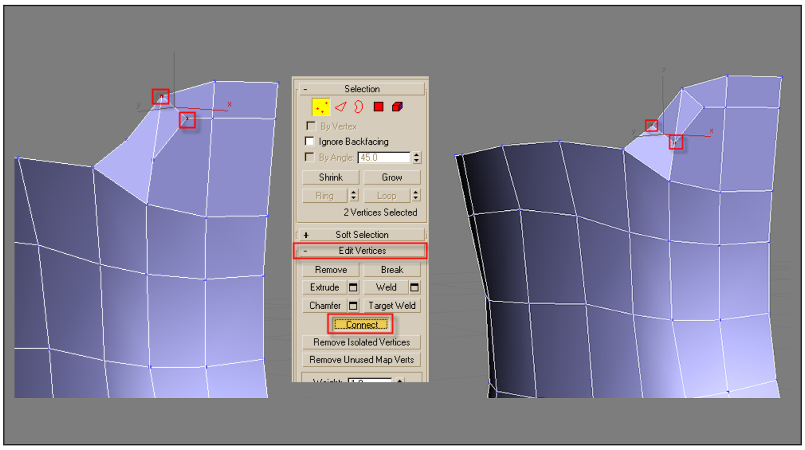
37. Press Cut and create new lines as shown below. (**Fig.37**)

Fig 37



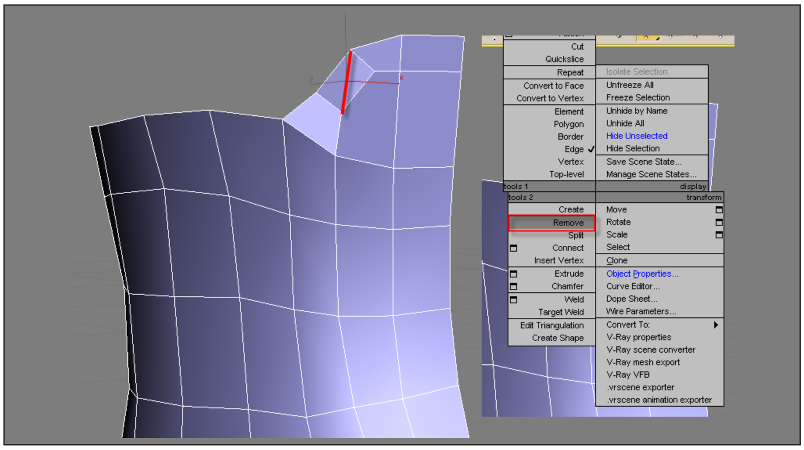
38. Connect some vertices to get a better wire. Select vertices one by one and press Connect. (**Fig.38**)

Fig 38



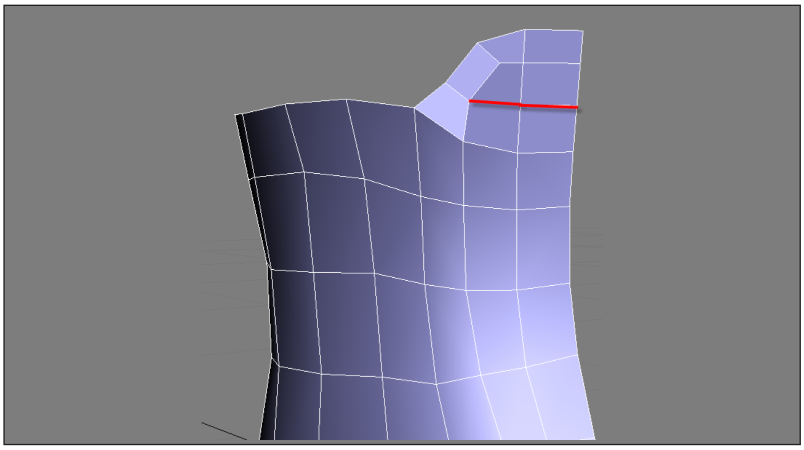
39. Remove the edge at the middle (**Fig.39**)

Fig 39



40. Cut a new line to remove rectangles and to keep only heavenly spaced quads. (**Fig.40**)

Fig 40



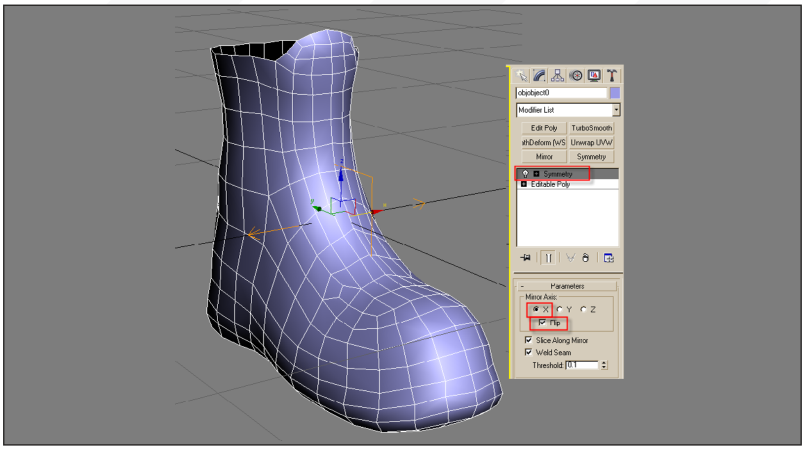


Fig 41

41. Apply a Symmetry modifier and check the parameters as shown below. As you can see, we created a symmetrical base mesh for the shoe. This technique is very useful in order to save time and to increase the quality. As soon as the shoe is finished, we will just have to put it back to the right position and to move some vertices to get closer to a real "asymmetrical" shoe. (**Fig.41**)

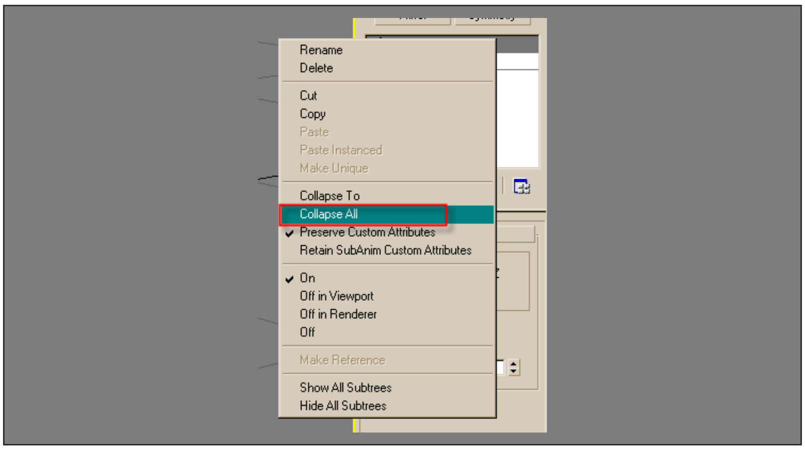


Fig 42

42. Collapse the stack modifier. (**Fig.42**)

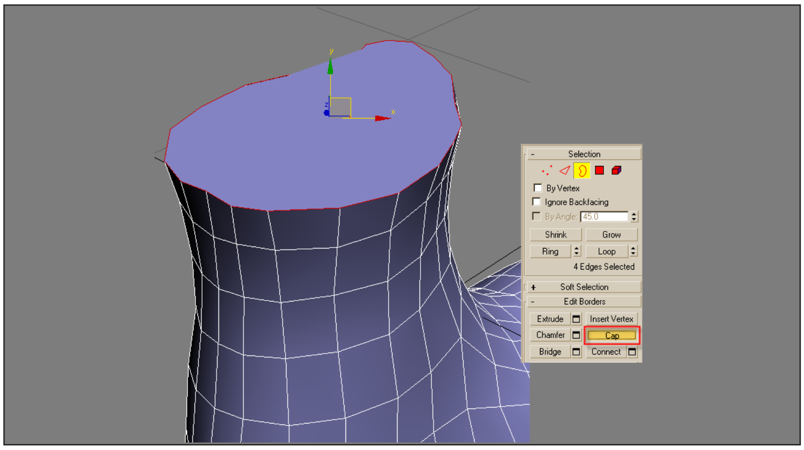


Fig 43

43. In Border mode, select the top of the object and press Cap. (**Fig.43**)

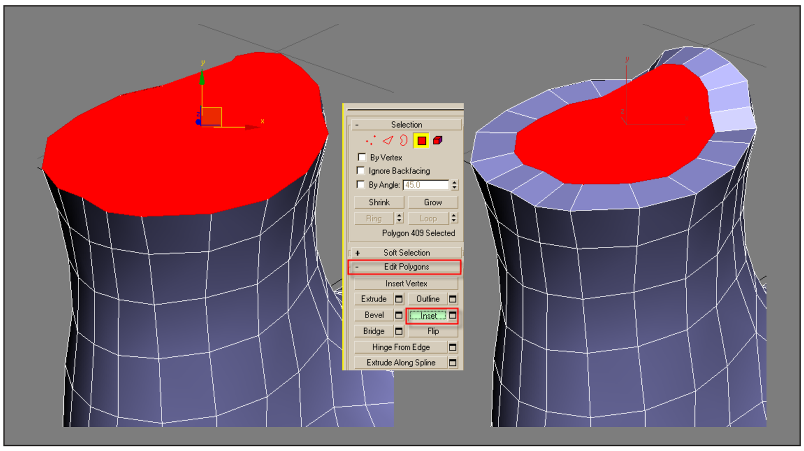
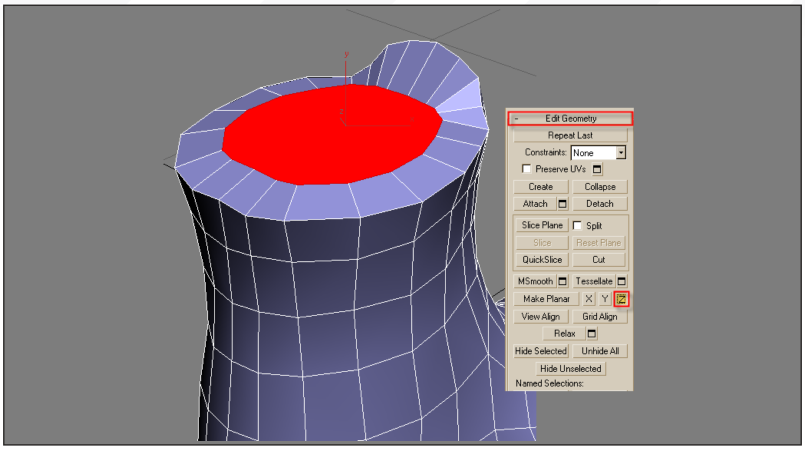


Fig 44

44. Select the big face and inset it once. (**Fig.44**)

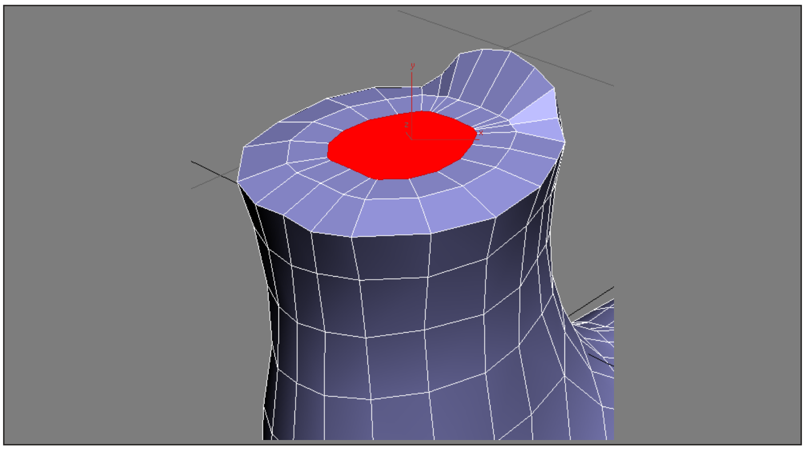
45. Make the face planar along the Z axis. (**Fig.45**)

Fig 45



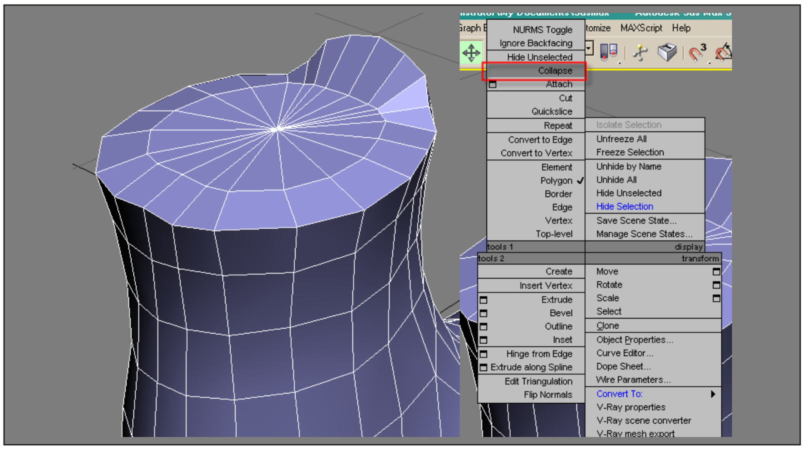
46. Inset again. (**Fig.46**)

Fig 46



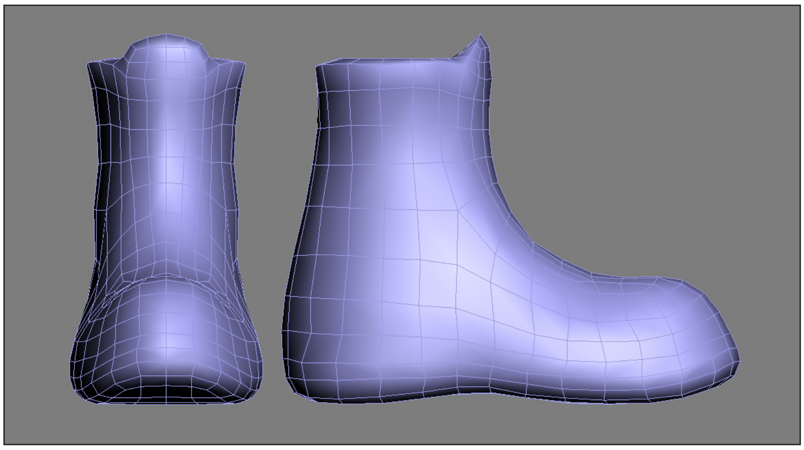
47. Now collapse it and the mesh is now properly closed. We don't particularly need to keep perfect quads on the top because it will be an hidden area. (**Fig.47**)

Fig 47



48. Here is a final preview of the shoe base mesh. (**Fig.48**)

Fig 48



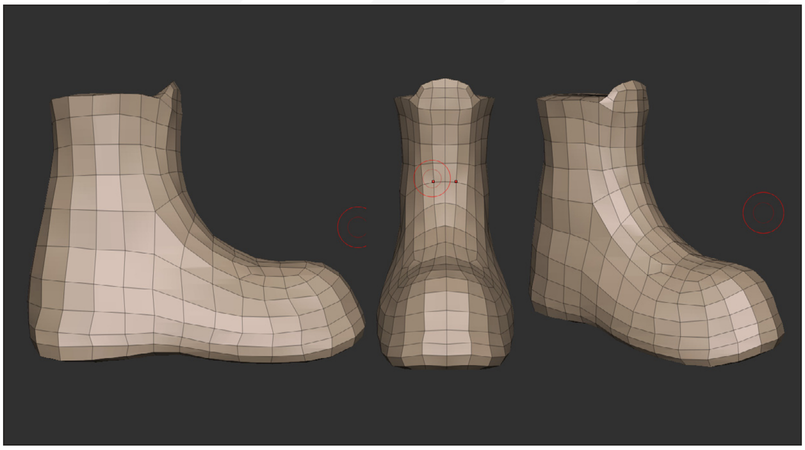


Fig 49

49. Go back to Zbrush and import the newly created base mesh. (**Fig.49**)

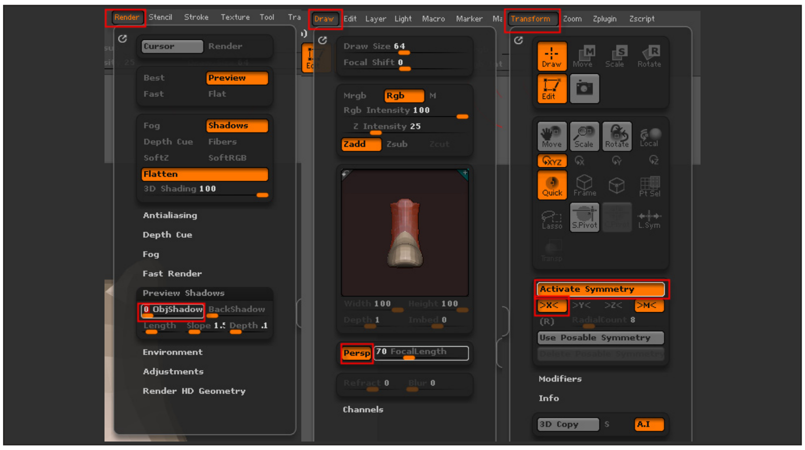


Fig 50

50. Don't forget to check some parameters before starting sculpting. Remove the real time shadows, turn on the perspective view and activate the X symmetry. (**Fig.50**)

Fig 51

51. The basic sculpt that we are going to do next will be achieved in the main thanks to the Move and Dam Standard brushes. (**Fig.51**)

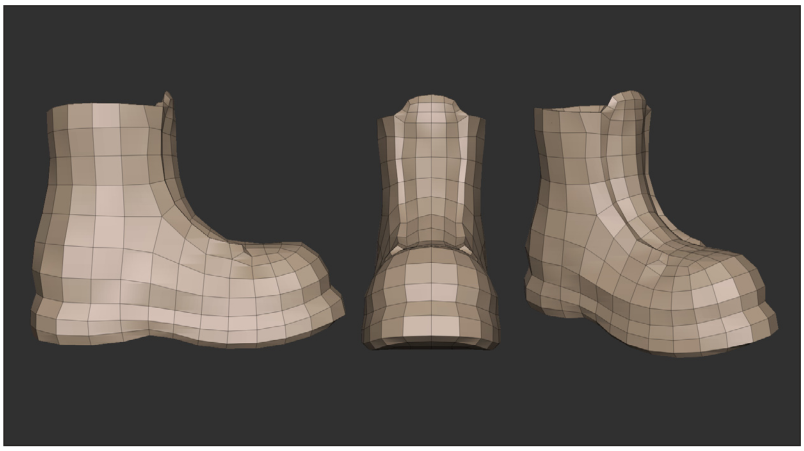
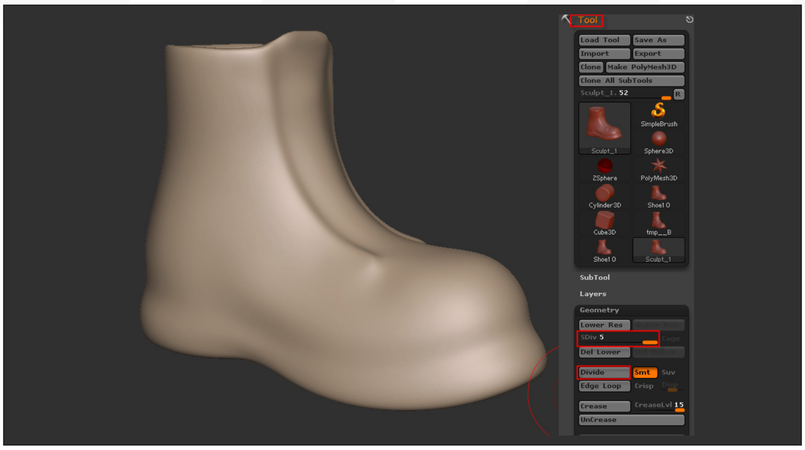


Fig 52

52. Don't subdivide the shoe but rather make the changes at the level 0 which will make it easier to get a new shape by keeping something clean and sharp. (**Fig.52**)

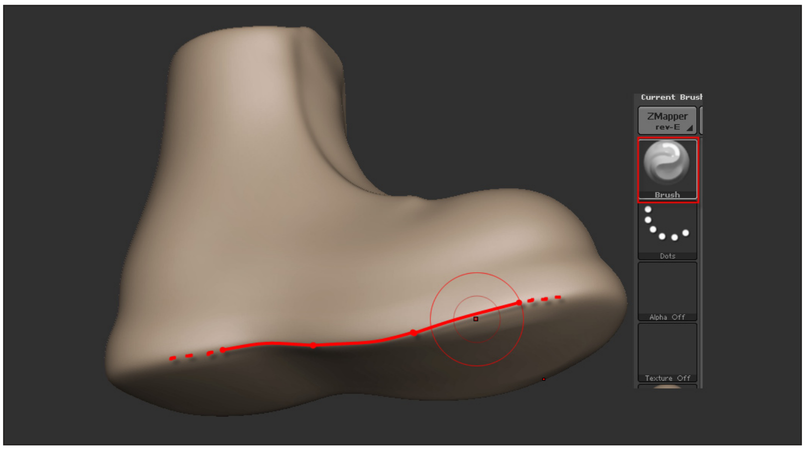
53. Now you are ready to add more subdivisions. (**Fig.53**)

Fig 53



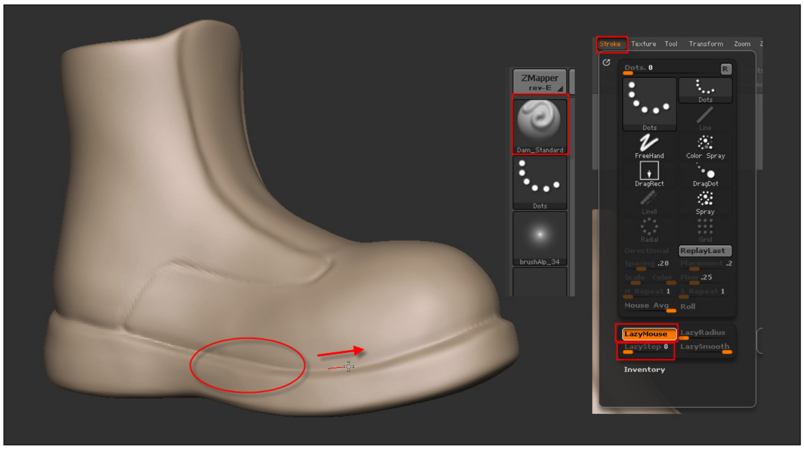
54. With the Pinch brush selected, add more definition on the sole edge just to make it a little bit sharper. (**Fig.54**)

Fig 54



55. With the Dam standard brush, go to Stroke panel, enable LazyMouse and change the LazyStep value to 0. This will allow you to make some very clean lines. Bear in mind that you still have to draw them slowly in order to get the best results. (**Fig.55**)

Fig 55



56. Select Clay brush to have sharp painting parameters. Then with Ctrl pressed paint a mask on the shoe as shown below. (**Fig.56**)

Fig 56

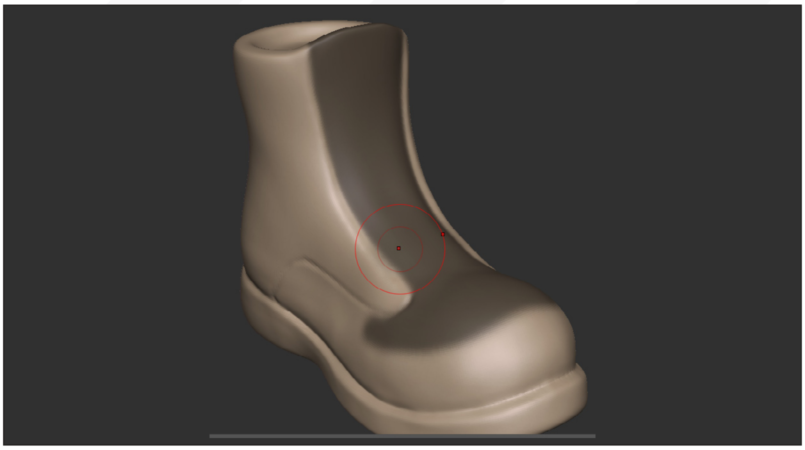


Fig 57

57. When the mask is well defined, release Ctrl. Then press Ctrl + click on the mesh to blur the mask. (**Fig.57**)

Fig 58

58. Now with the move brush, pull out the surface on each side of the tongue. (**Fig.58**)

Fig 59

59. Remove the mask. To remove it press Ctrl + drag a selection box out of the mesh in the canvas then release Ctrl and finally release the mouse. (**Fig.59**)

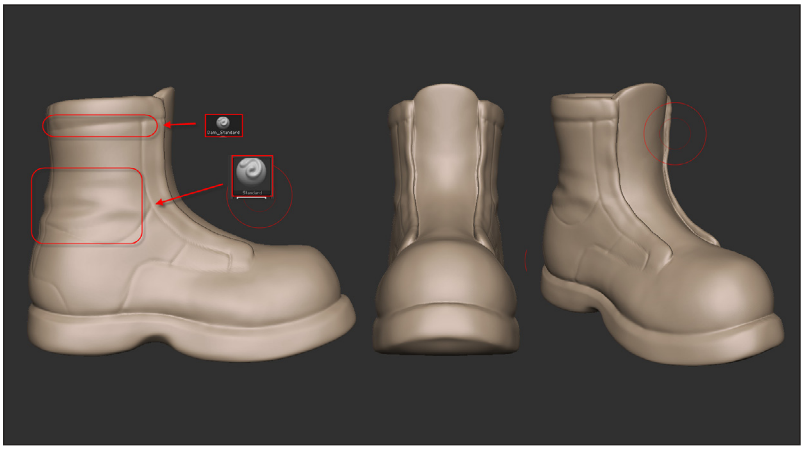
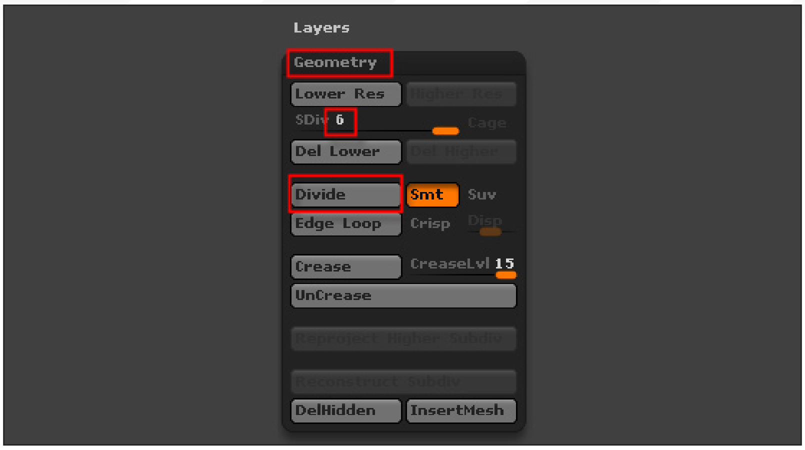


Fig 60

60. Now with Dam Standard and Standard brush, add some folds at the back of shoe to simulate some bending artifacts and add some lines to create more pieces of leather. (**Fig.60**)

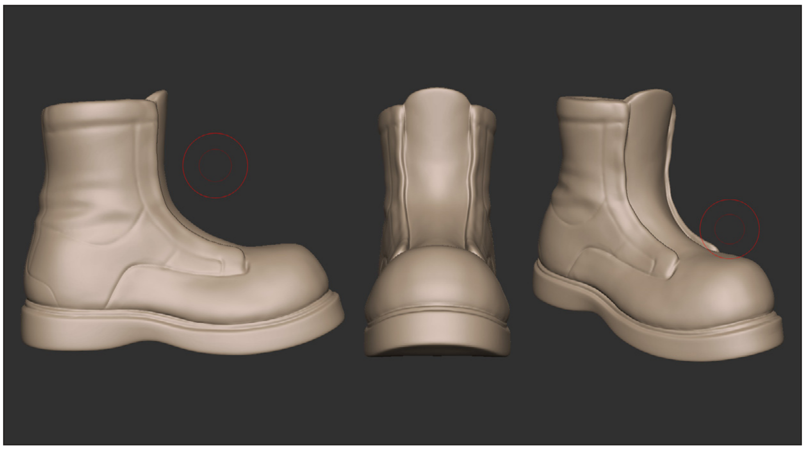
61. Divide the shoe once more. (**Fig.61**)

Fig 61



62. With the same technique explained above (see 55), add more lines to the sole. (**Fig.62**)

Fig 62



63. Now we are going to add more thickness to the different leather pieces. Select Slash 2 brush under the Stroke panel, activate LazyMouse and change the LazyStep to 0. These parameters are very important if you want to get very smooth lines. Right click to open the popup menu and change the intensity to 16. Finally add one more subdivision to increase the level of quality. (**Fig.63**)

Fig 63

64. Now you just have to sculpt slowly on the top of the lines you previously drew. Below are some screenshots of what you can achieve. (**Fig.64**)

Fig 64

Fig 65

65. More screenshots from different angles. (**Fig.65**)

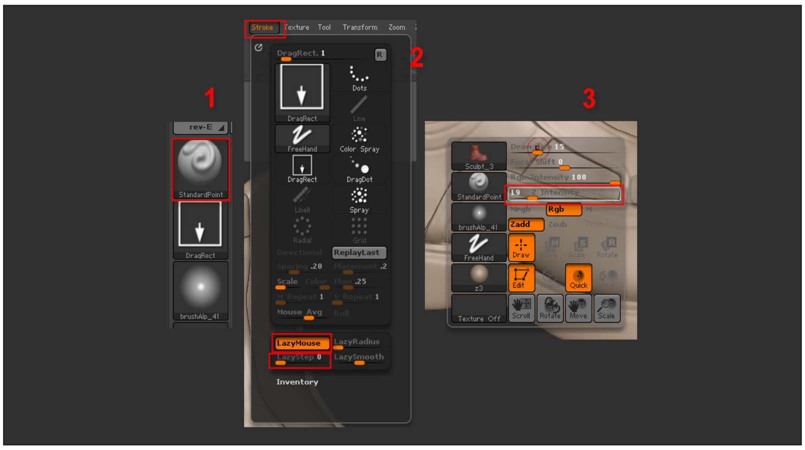


Fig 66

66. As we did for leather pieces, we are going to prepare some stitches. Select Standard point Brush applying the same Stroke changes as above and change the intensity value to 19. It's often good to keep a small value when you use Lazymouse with LazyStep at 0. (**Fig.66**)

Fig 67

67. Now draw two lines for each piece, one close to the extremity and the second one alongside it. (**Fig.67**)

Fig 68

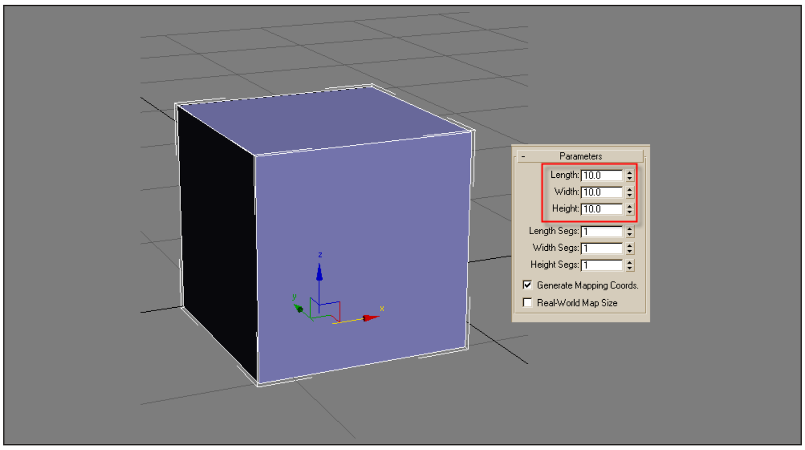
68. Select the Stitch simple brush created by my friend David Giraud and draw the stitches along the lines. (**Fig.68**)

69. A preview of what you can achieve at this stage. (**Fig.69**)

Fig 69

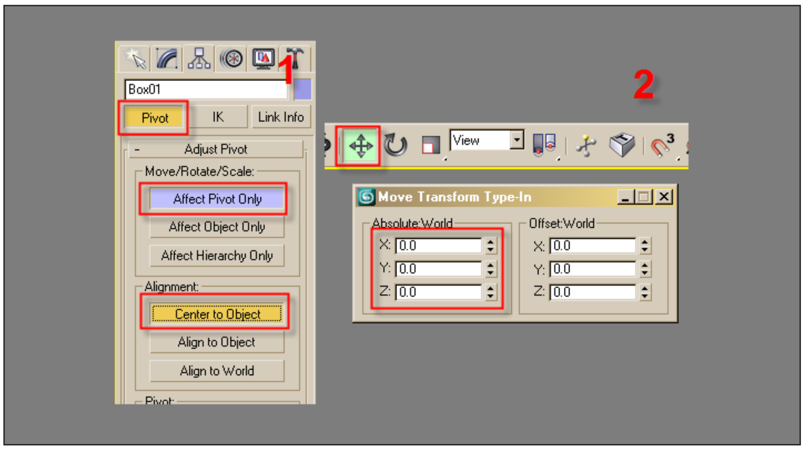
70. We are now going to create some accessories for the shoe. The next step will be to create the eyelets in max. Go back to 3ds max and create a simple cube in the scene with the following parameters. (**Fig.70**)

Fig 70



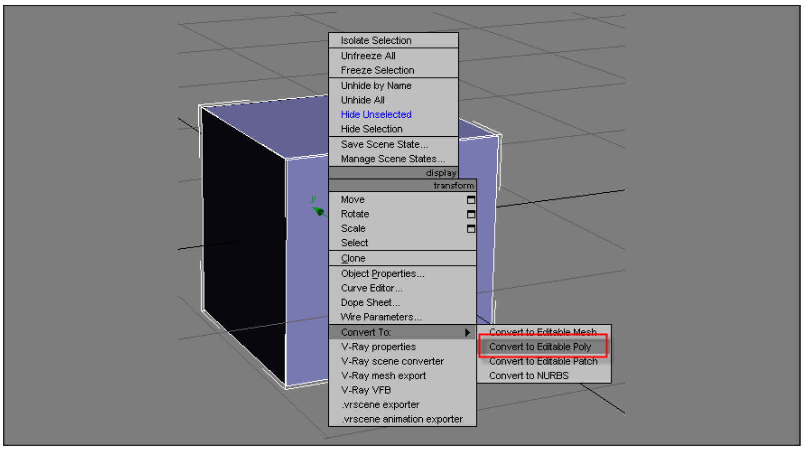
71. As you have done many times throughout this tutorial, put the pivot at the center of the object and move the object to the center of the scene. (**Fig.71**)

Fig 71



72. Convert it to an Editable poly to be able to make some modifications. (**Fig.72**)

Fig 72



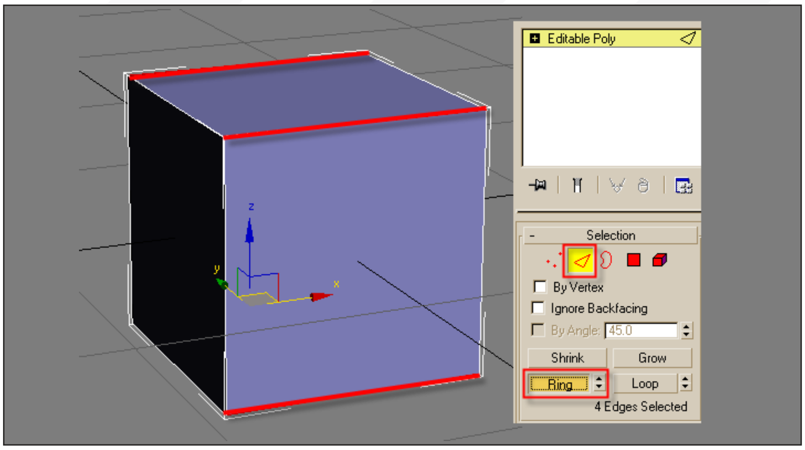


Fig 73

73. Select a horizontal edge and click on Ring to select the corresponding edge ring. (**Fig.73**)

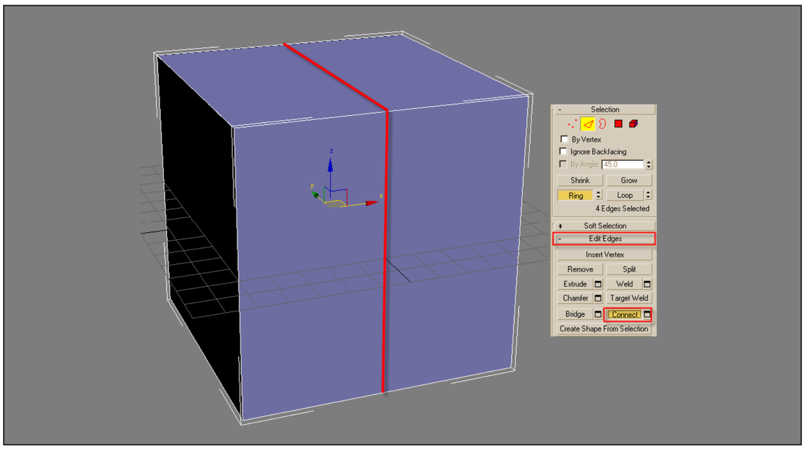


Fig 74

74. Press Connect to create an edge loop at the middle. (**Fig.74**)

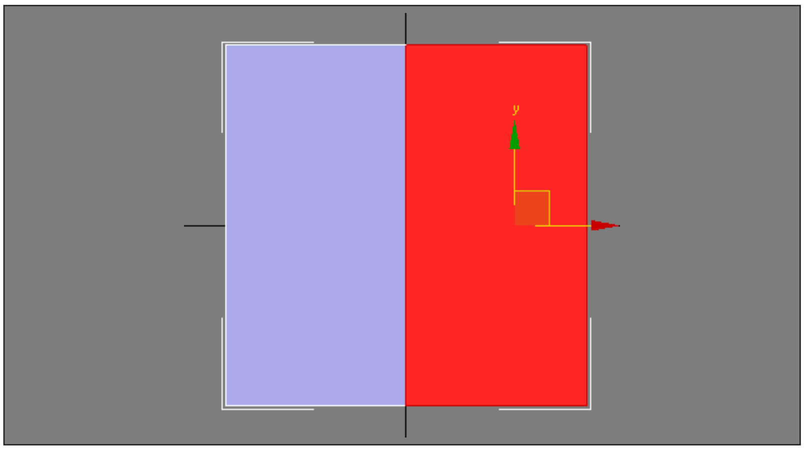


Fig 75

75. Select the right side and press delete. (**Fig.75**)

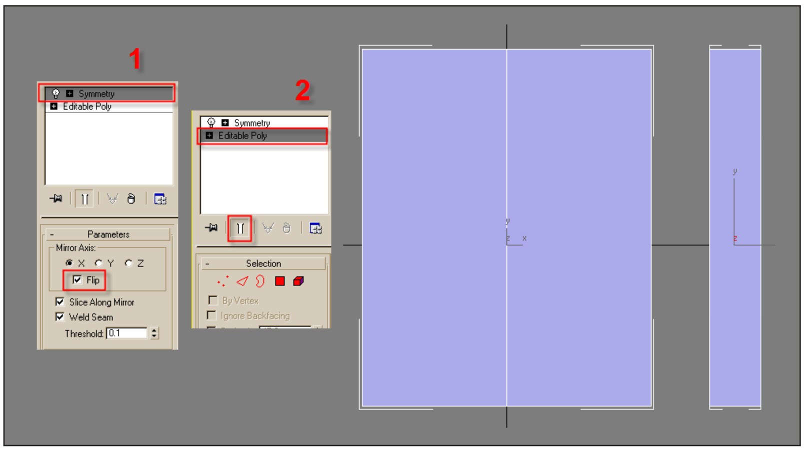
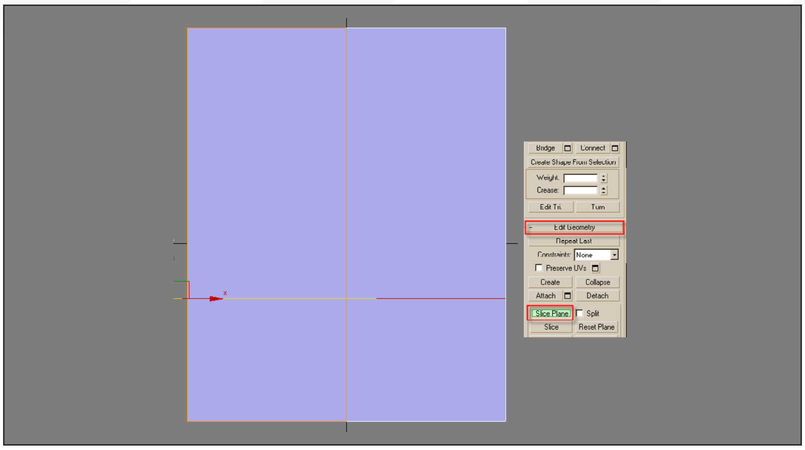


Fig 76

76. Apply a Symmetry modifier but don't forget to check Flip otherwise you won't see anything. Now go back to Editable Poly in the stack and press the White T to enable the Symmetry modifier and see the instanced right side. (**Fig.76**)

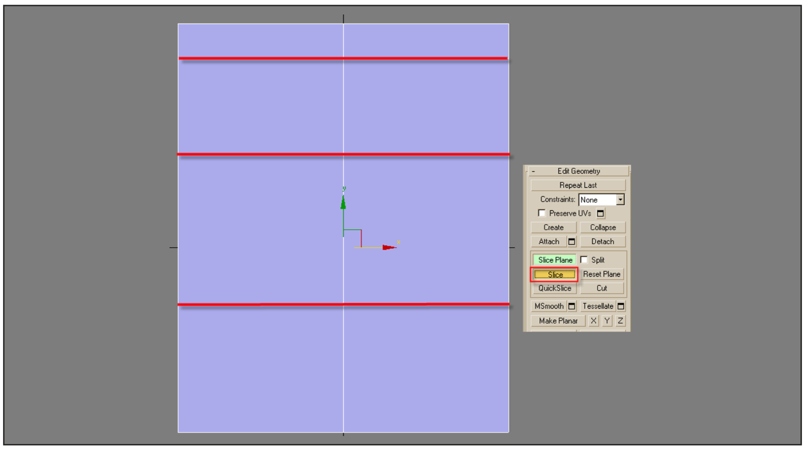
77. In the front view, click Slice Plane and a yellow edge appears that you are able to move. That will allow us to make a new section in the current mesh. (**Fig.77**)

Fig 77



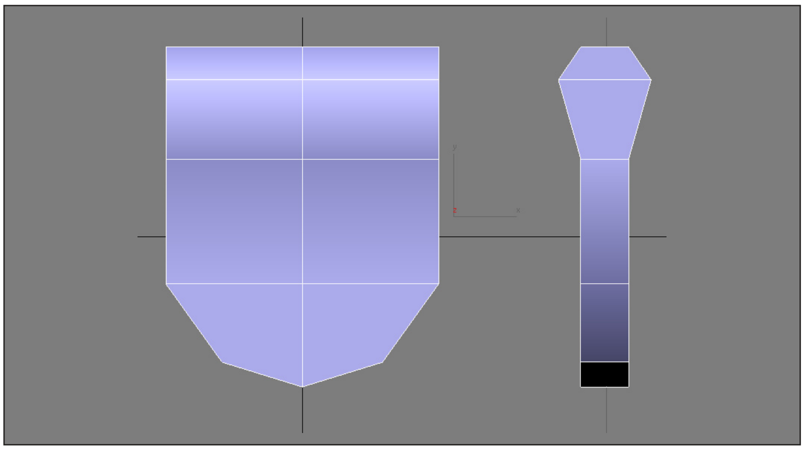
78. Using the slice plane, make three different cuts as shown below. To do this, move the plane and simply press Slice, resulting in a new horizontal edge loop. (**Fig.78**)

Fig 78



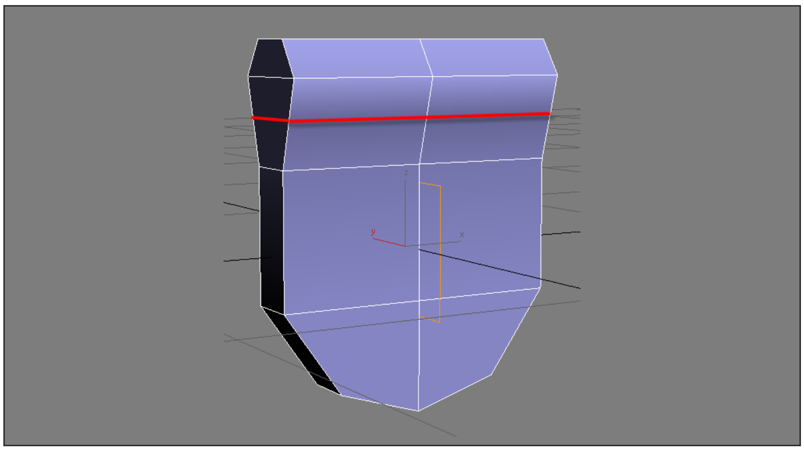
79. Still in the front view to keep in track, move some of the vertices. We define first the main shape. (**Fig.79**)

Fig 79



80. Using the same Slice Plane technique, make a new cut across the top of the object. (**Fig.80**)

Fig 80



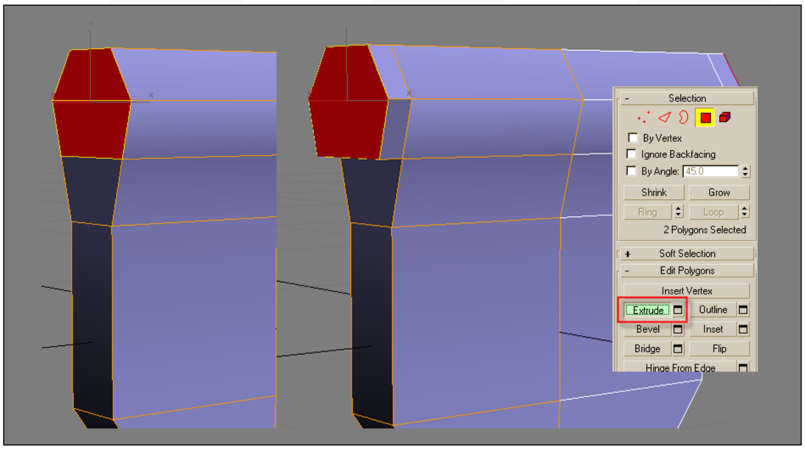


Fig 81

81. Select the faces at the extreme left and extrude them by pressing the Extrude button. (**Fig.81**)

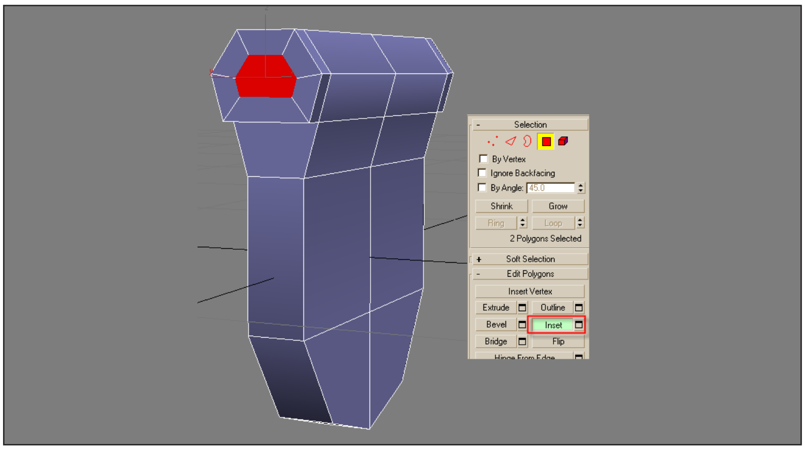


Fig 82

82. Use the Inset function to create and scale the new faces allowing us to give thickness to the object. (**Fig.82**)

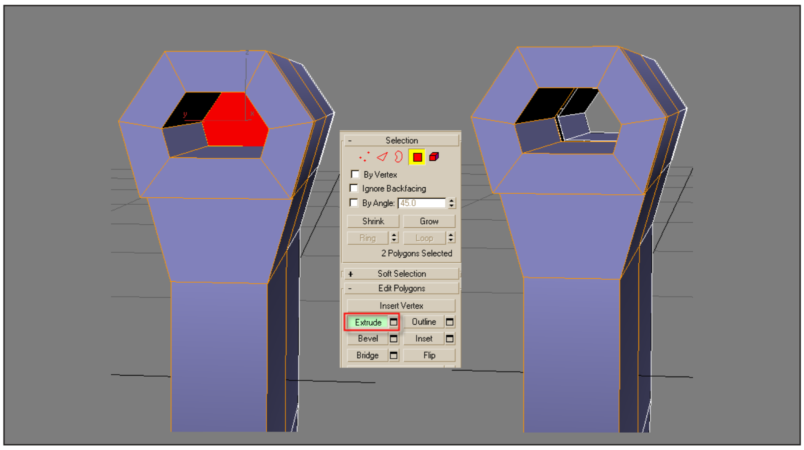


Fig 83

83. With the new faces still selected, extrude them to the inside to create a corridor and then delete them. (**Fig.83**)

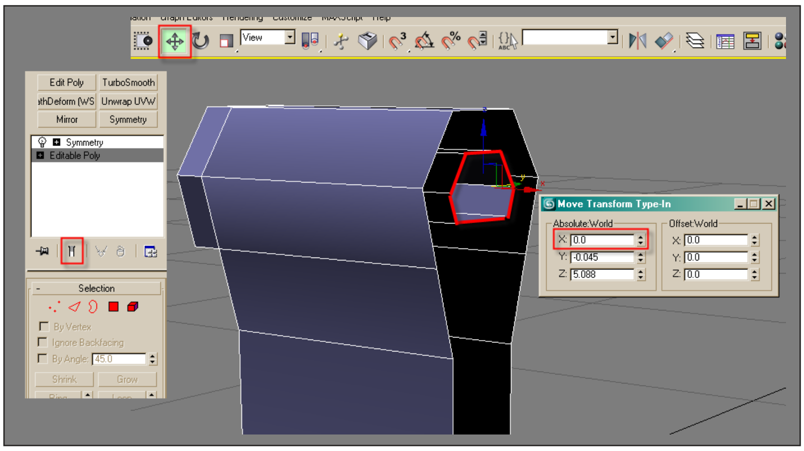
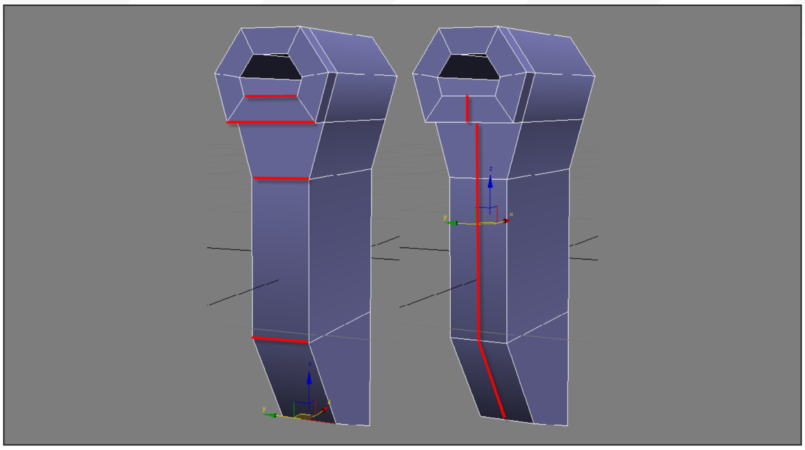


Fig 84

84. First disable the preview Symmetry modifier to be able to see the inside and then move the edges at the middle of the scene with the same technique as explained above (see 26). (**Fig.84**)

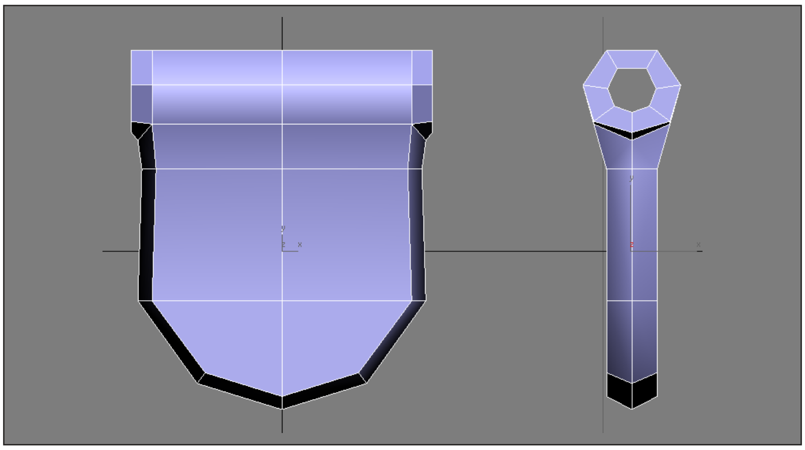
85. Select an edge on the side, then press ring Loop and finally press Connect to create a new edge loop. (**Fig.85**)

Fig 85



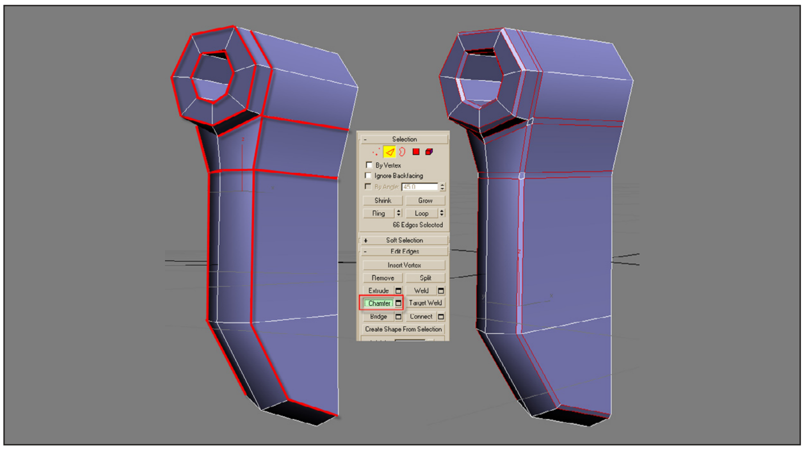
86. Here is a preview of the current stage. (**Fig.86**)

Fig 86



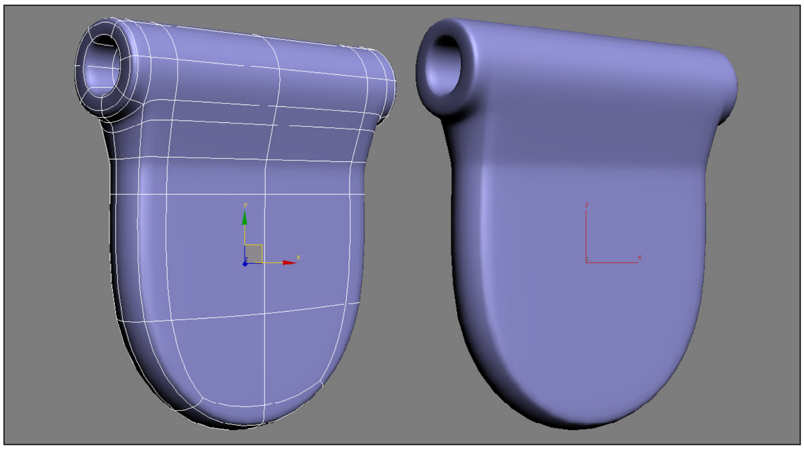
87. Select all the edges as shown below, even at the rear of the object and press Chamfer to duplicate them which will sharpen some of the lines. (**Fig.87**)

Fig 87



88. Apply a Meshsmooth modifier or a Turbosmooth modifier to see a more final preview. (**Fig.88**)

Fig 88



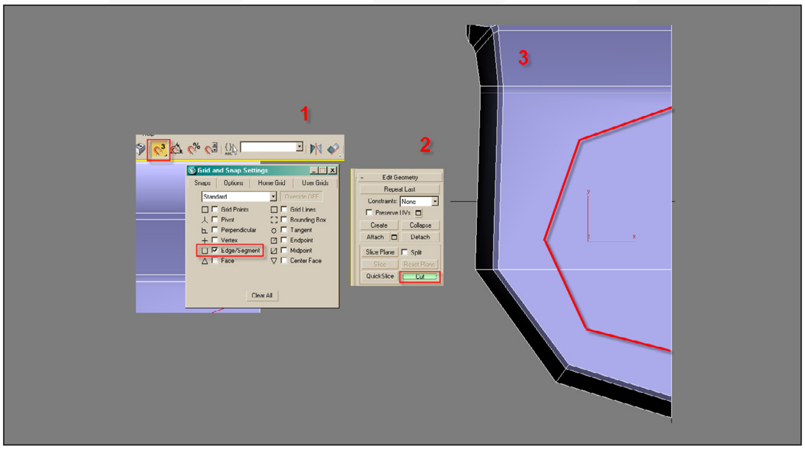


Fig 89

89. Remove the Meshsmooth modifier first, then activate the snap option and right click it. Be sure that Edge/segment only is checked. Press Cut and draw half a hexagon at the bottom of the eyelet. (**Fig.89**)

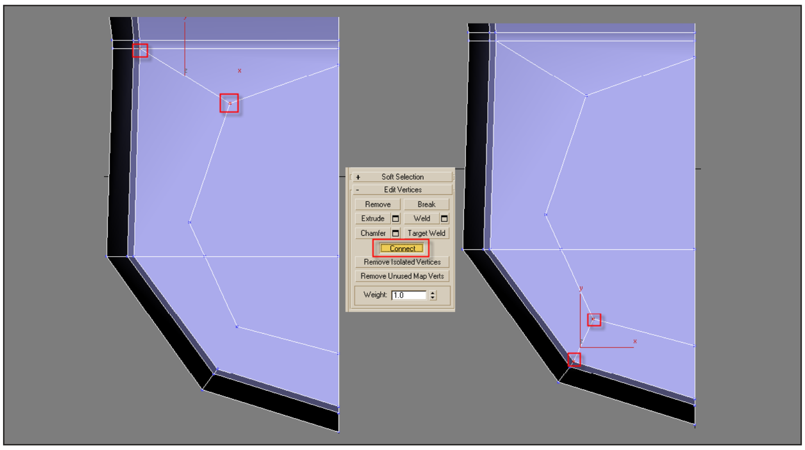


Fig 90

90. Let's now rearrange some vertices to get proper quads. Select the vertices shown below and press Connect to create new edges. (**Fig.90**)

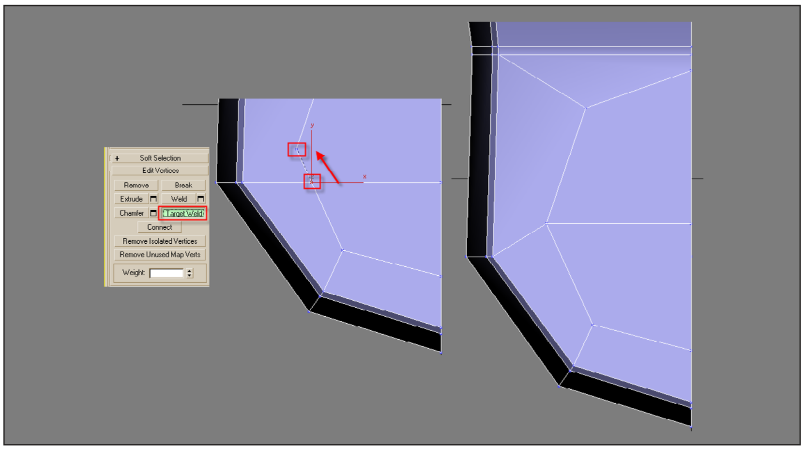


Fig 91

91. Finally Press Target Weld, and snap / collapse the first vertex with the second one. (**Fig.91**)

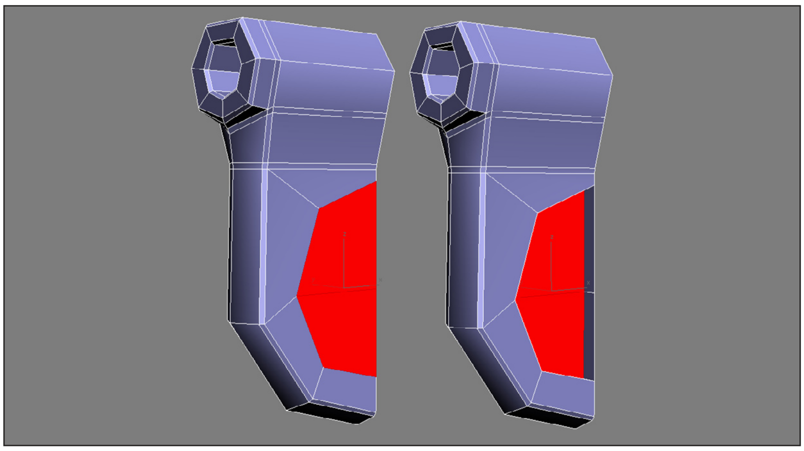
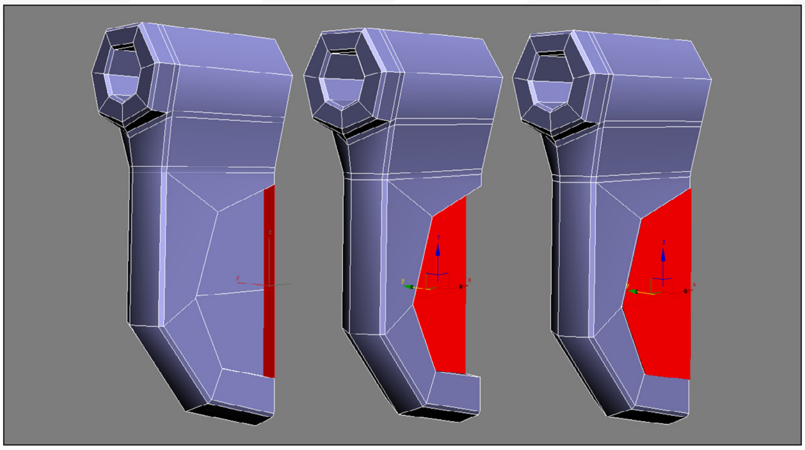


Fig 92

92. We are now going to create a button. With the faces shown below selected, extrude them inside. (**Fig.92**)

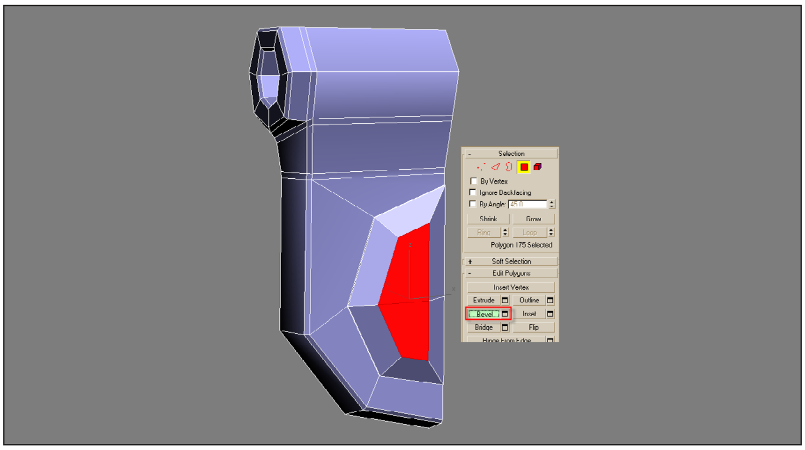
93. Remove the selected faces, then reselect the half button and re-extrude them to the outside. (**Fig.93**)

Fig 93



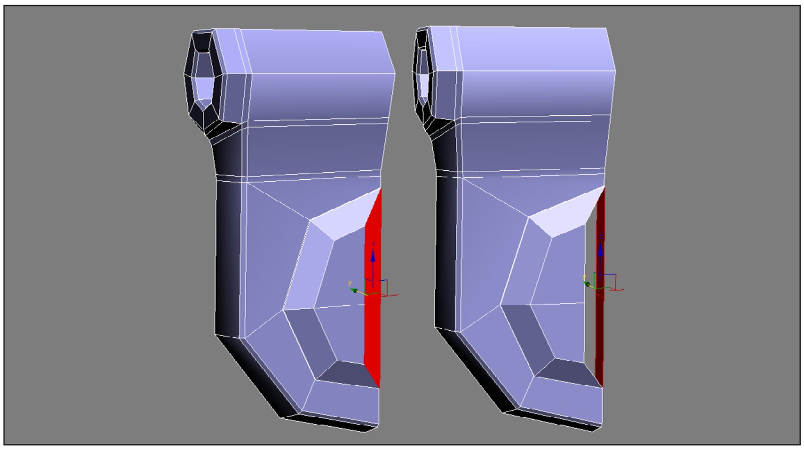
94. With the faces still selected, press Bevel. (**Fig.94**)

Fig 94



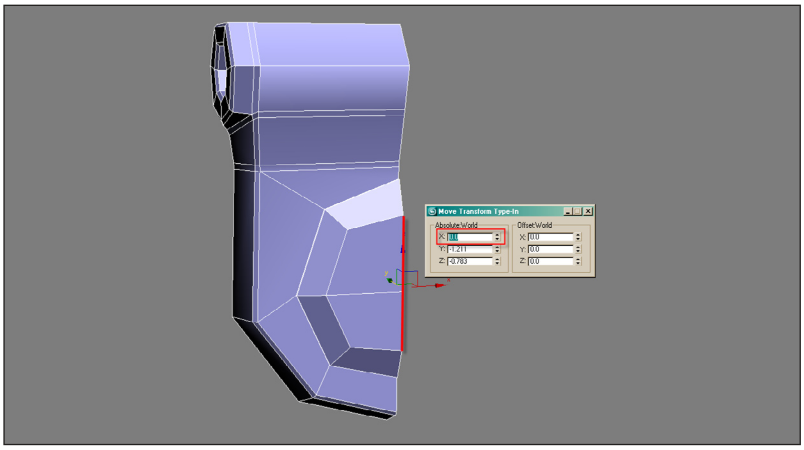
95. Remove the unwanted faces that will cause trouble when you make it Symmetrical. (**Fig.95**)

Fig 95



96. Select edges at the extreme right and align them along the symmetry axis by changing the x value (see 26 to see the display pop up). (**Fig.96**)

Fig 96



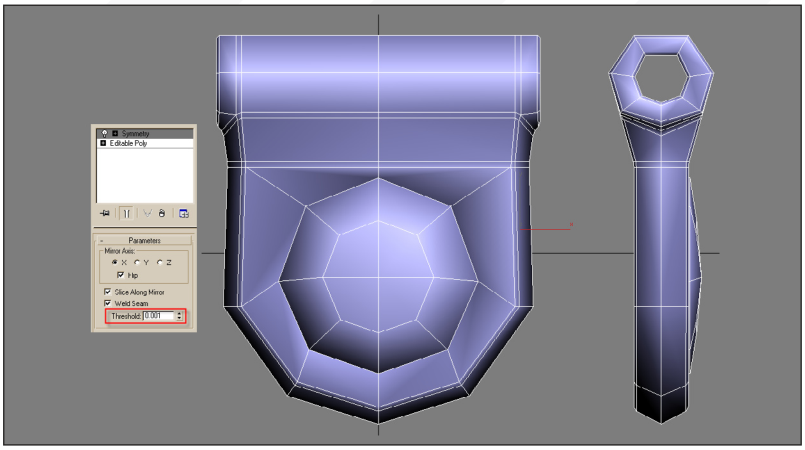


Fig 97

97. You can now apply a Symmetry modifier by changing the Threshold value to weld similar vertices along the middle. (**Fig.97**)

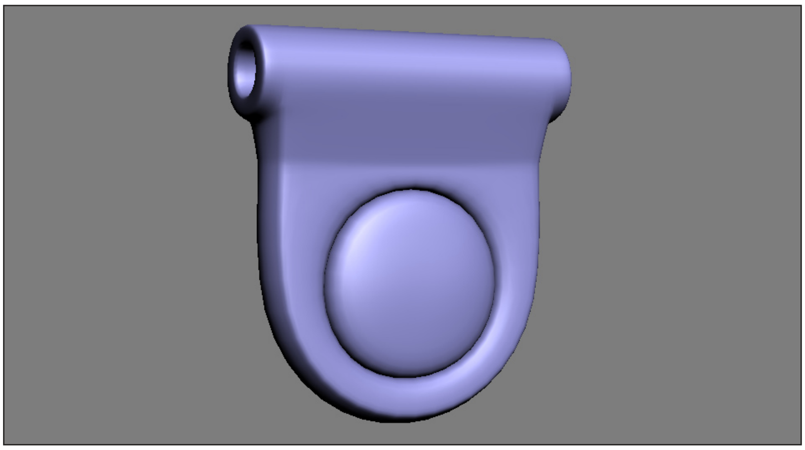


Fig 98

98. A smoothed preview of the eyelet. (**Fig.98**)

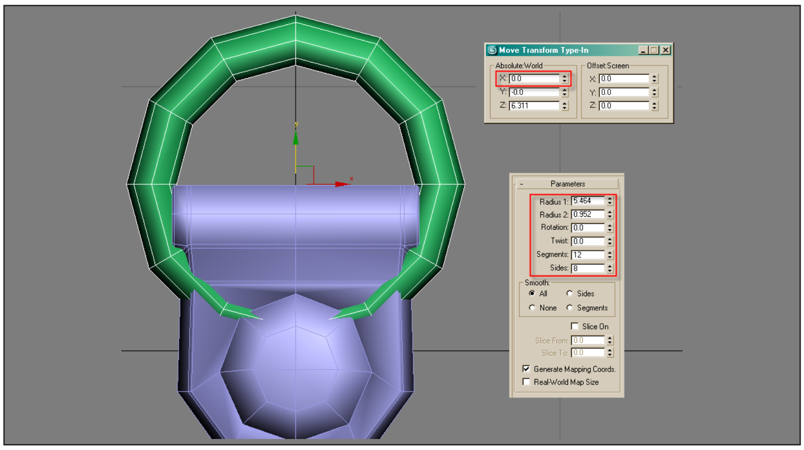


Fig 99

99. We are now going to create the half ring attached to the eyelet. Create a simple Torus primitive with the parameters shown below. Then move it to be at the center of the scene. (**Fig.99**)

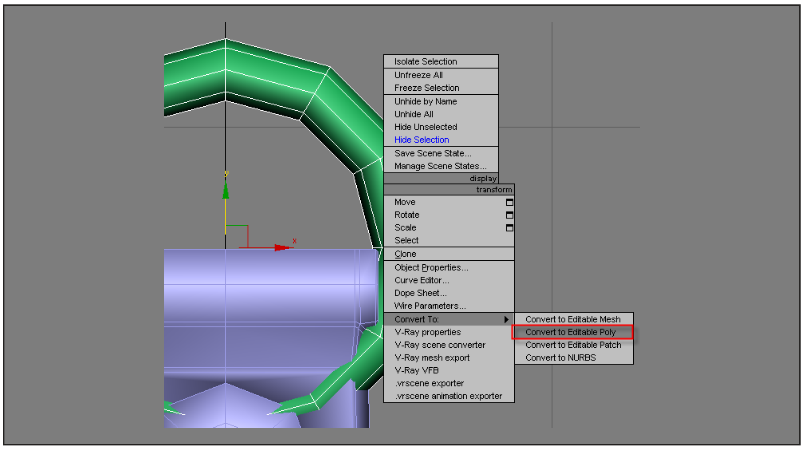
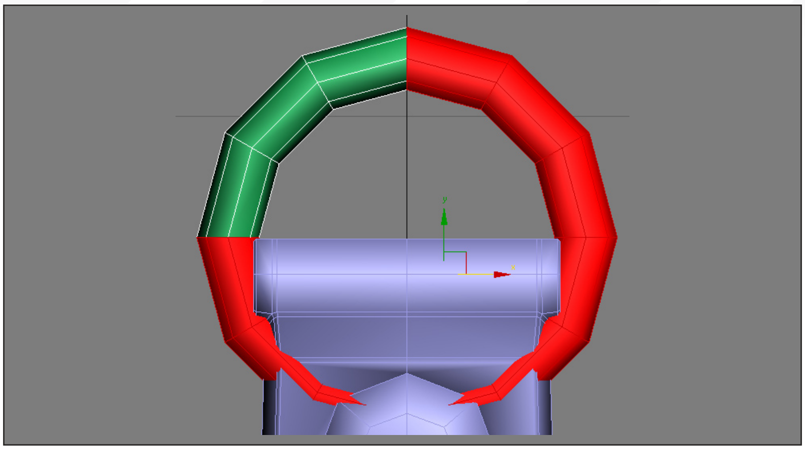


Fig 100

100. Convert it to an Editable Poly. (**Fig.100**)

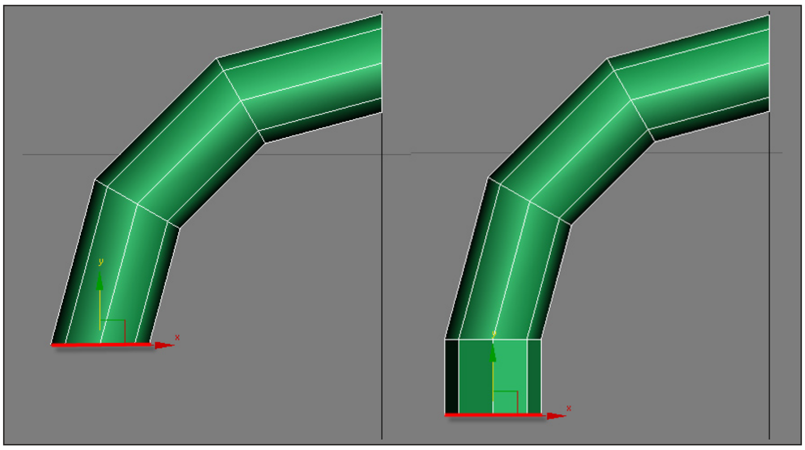
101. Select and remove three quarters of the object. We don't need the bottom part and the right one will be created symmetrically. (**Fig.101**)

Fig 101



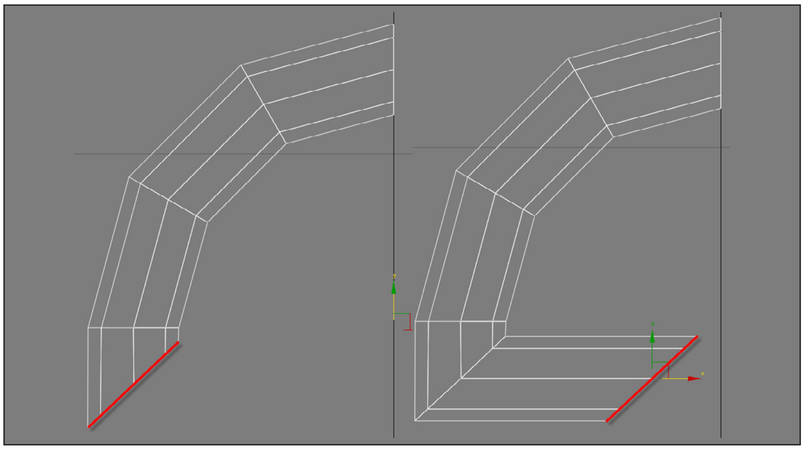
102. On the remaining quarter, select the edge loop at the bottom and extrude it using Shift + Move. (**Fig.102**)

Fig102



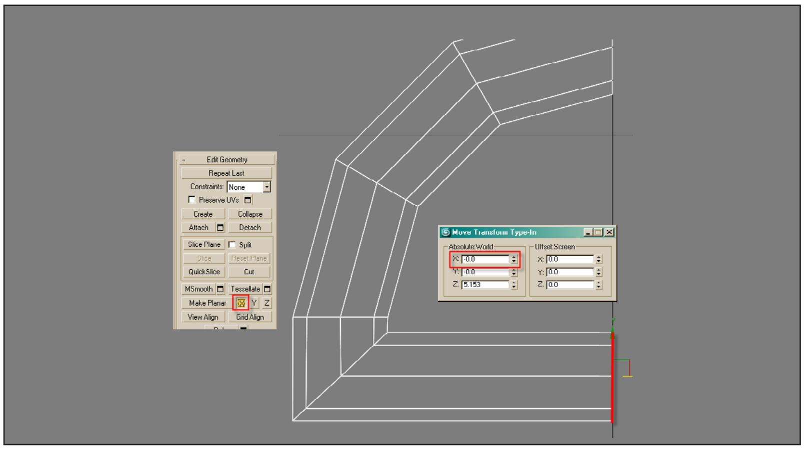
103. Rotate the edges and extrude them once more. (**Fig.103**)

Fig103



104. Finally align them along the x axis. (**Fig.104**)

Fig 104



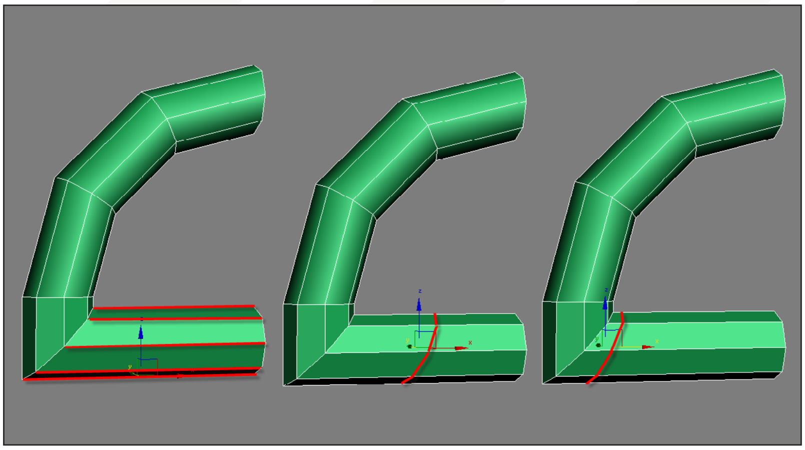


Fig 105

105. Select ring loop at the bottom and press Connect to add an edge loop. This new edge loop will allow us make the corner more angular. (**Fig.105**)

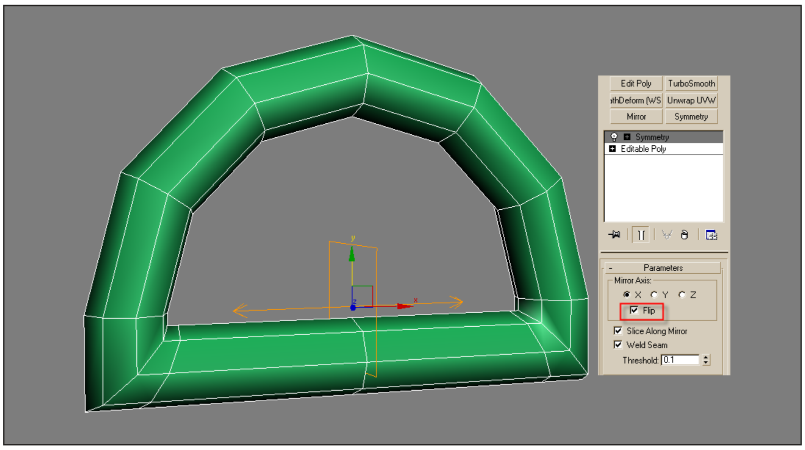


Fig 106

106. Create the symmetry but don't forget to enable Flip to be able to see something. (**Fig.106**)

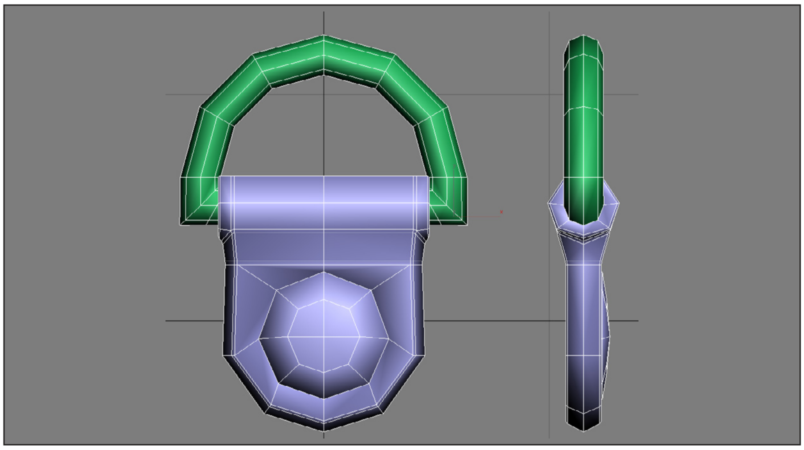


Fig 107

107. Some screenshots from different angles. (**Fig.107**)

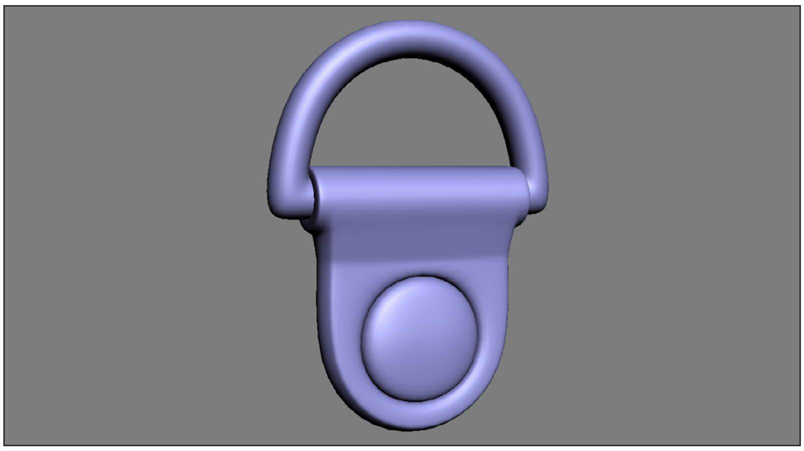
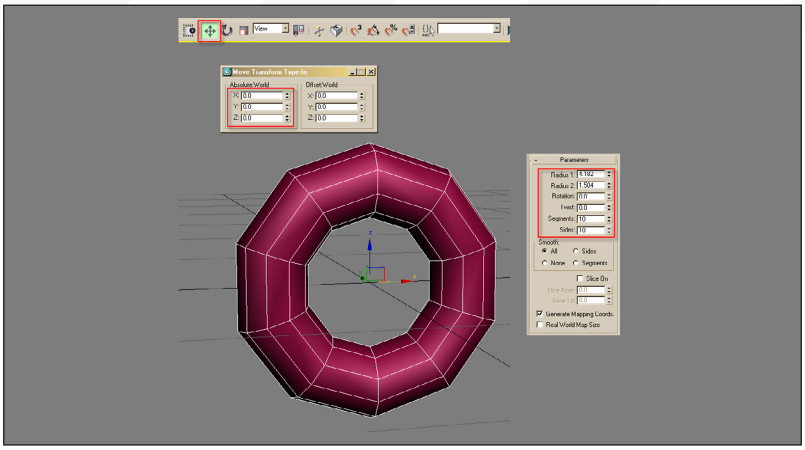


Fig 108

108. Here is a Meshsmoothed final preview of the first eyelet. (**Fig.108**)

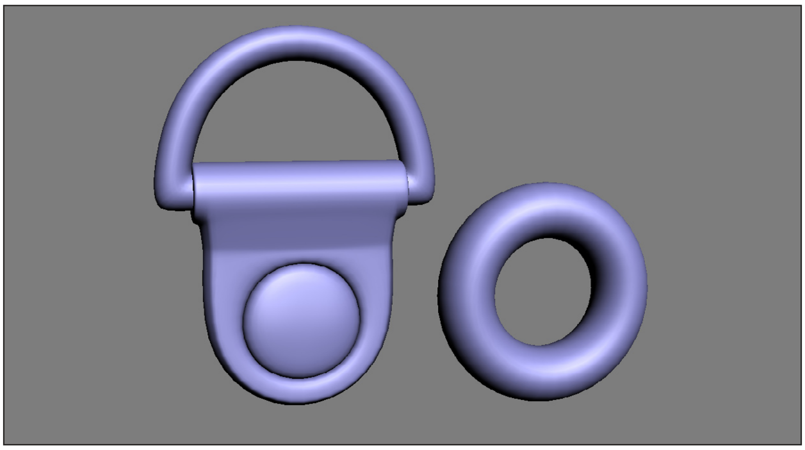
109. We are now going to create the second one which is much simpler. Create a Torus with the same parameters as below and center it in the scene. (**Fig.109**)

Fig 109



110. This completes the eyelet accessories. Next step is to postion them correctly on the shoe. (**Fig.110**)

Fig 110

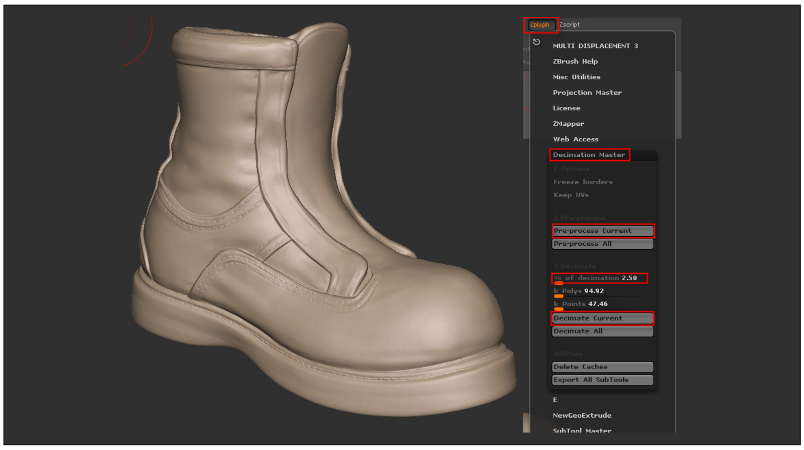


111. Go back to ZBrush and reload the last sculpting stage of the shoe. (**Fig.111**)

Fig 111

112. Under the Zplugin Tab, scroll down to Decimation Master. You could get the plugin here http://www.pixologic.com/zbrush/downloadcenter/zplugins/. This plugin will allow you to optimize your high subdivision mesh into a mid resolution one. It will be much easier than to import the new mesh into 3dsmax and will save a lot of memory. So, open the Decimation master menu, change the % of decimation to 2,5 and press Pre-process Current to compute the analyzing treatment. Once done, press Decimate Current to get a new light mesh. You can now export it. (**Fig.112**)

Fig 112



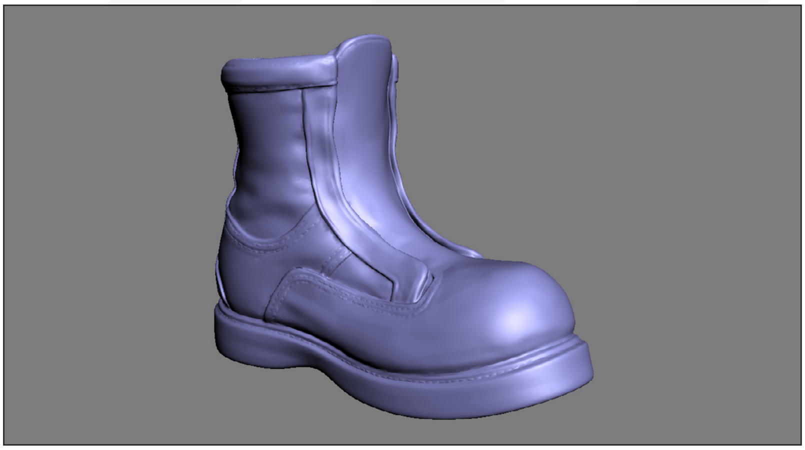


Fig 113

113. Import it into 3dsmax and you may see some minor artifacts but that won't cause any trouble. We just need a reference object to place accessories on. (**Fig.113**)

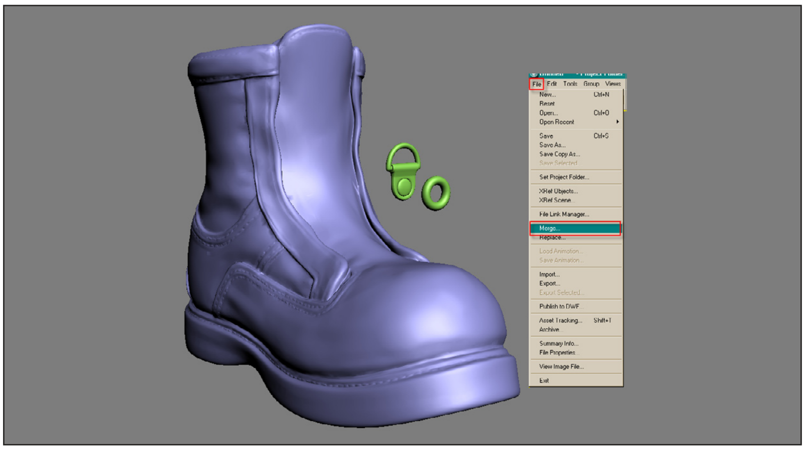


Fig 114

114. Merge the elements you've just created. (**Fig.114**)

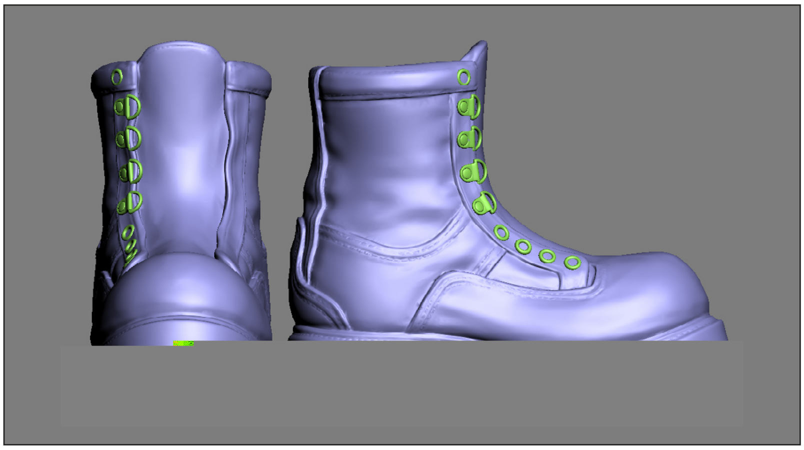


Fig 115

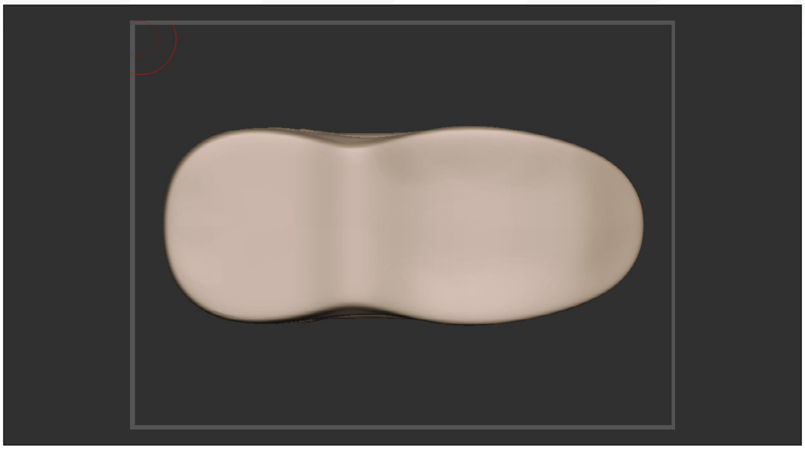
115. Duplicate and move them as shown below. (**Fig.115**)

Fig 116

116. A closer preview. (**Fig.116**)

133. Go back to ZBrush. (**Fig.133**)

Fig 133

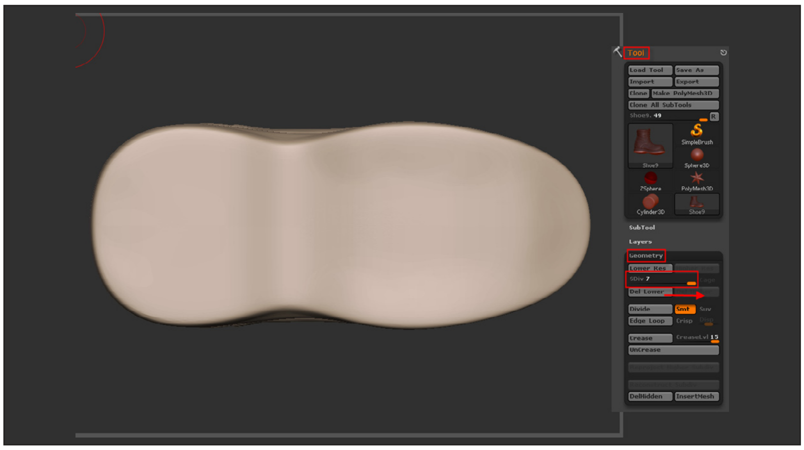


134. Mask the entire shoe except the sole in order to avoid any artifacts during the projection. First go down to subdivision 6 and then select Move instead of Draw on the top menu. Then follow the same technique as we used for chapter 1 by pressing Ctrl + drag the mouse from the middle of the sole to the bottom to get something similar to the following. (**Fig.134**)

Fig 134

135. Use Shift + move to lock the shoe to the bottom and change the subdivision value to its maximum. (**Fig.135**)

Fig 135



136. We are now ready to project. Press Projection Master on the top left. Once a pop-up appears change the parameters as shown below. (**Fig.136**)

Fig 136

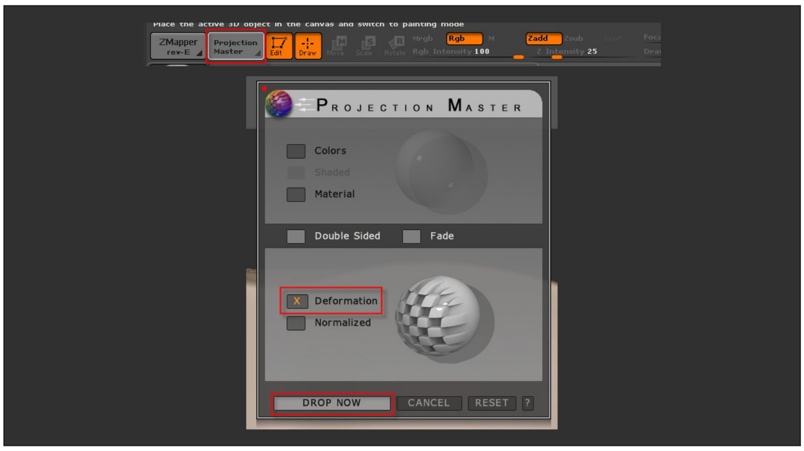


Fig 137

137. Change the Stroke and the alpha parameters on the left with the alpha you created in Photoshop, then right click in the canvas and change the intensity value to a lower one. (**Fig.137**)

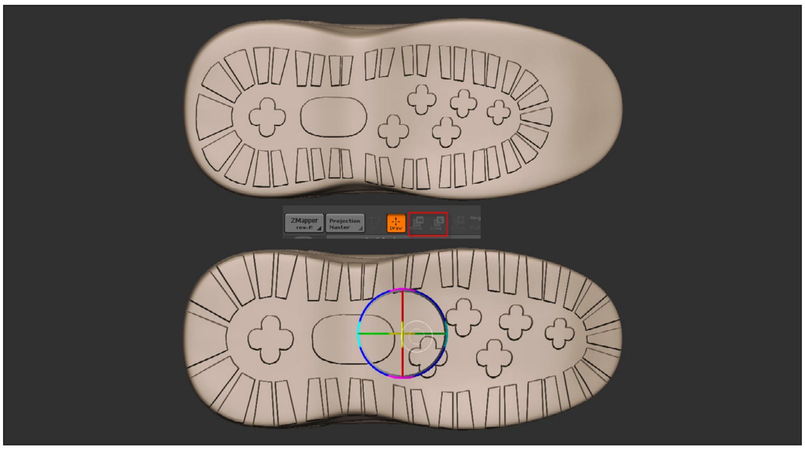


Fig 138

138. Drag the alpha on your object first, and then adjust it using the Move and Scale button at the top of the interface. (**Fig.138**)

Fig 139

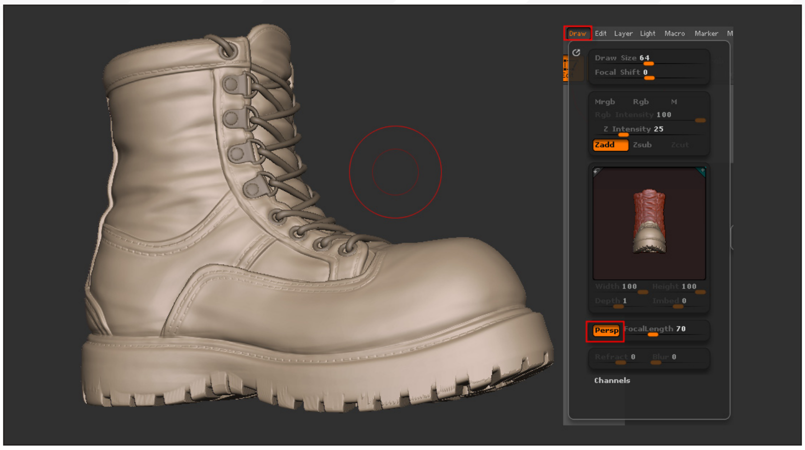
139. When you are satisfied, press the Projection master button once again and without changing anything press Pickup Now which will execute the projection. You can see a preview below. There will be some artifacts but we are going to fix those shortly. (**Fig.139**)

Fig 140

140. Remove the mask (see 59) (**Fig.140**)

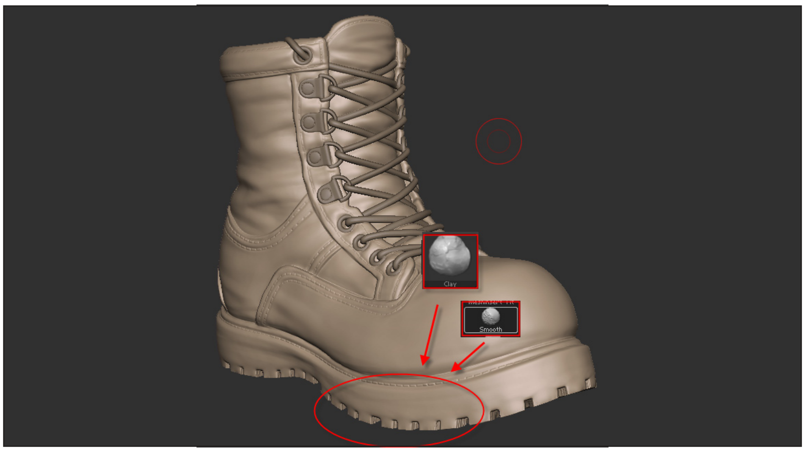
141. Re activate the perspective mode under the Draw Panel. (**Fig.141**)

Fig 141



142. Now use the Clay and Smooth brush to remove and polish the previously generated artifacts. Don't worry about the bumpy imperfections you may generate as this will add more realism. (**Fig.142**)

Fig 142



143. A current preview of the shoe after this last process. (**Fig.143**)

Fig 143

144. We are now going to prepare the mesh for the last accessory. (see 112) (**Fig.144**)

Fig 144

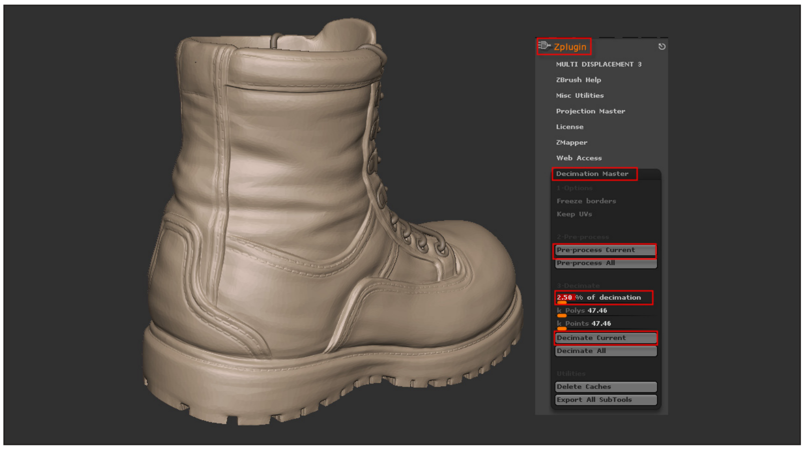


Fig 145

145. Import it in 3dsmax. (**Fig.145**)

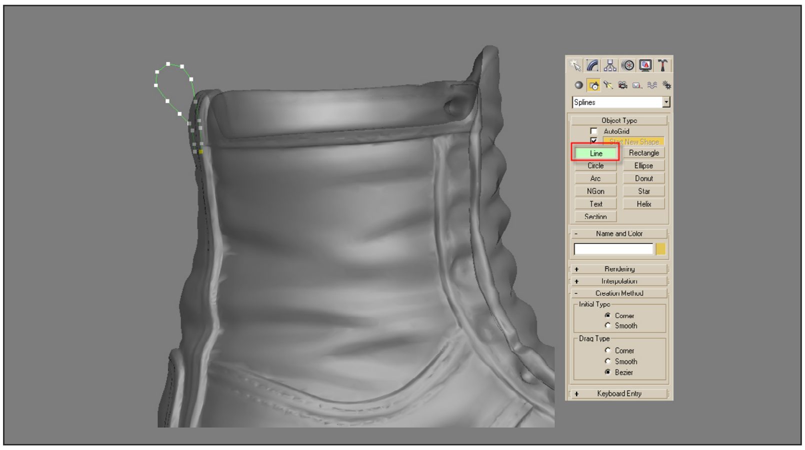


Fig 146

146. In the left view, create a line as shown below. We are going to create a leather buckle at the back. (**Fig.146**)

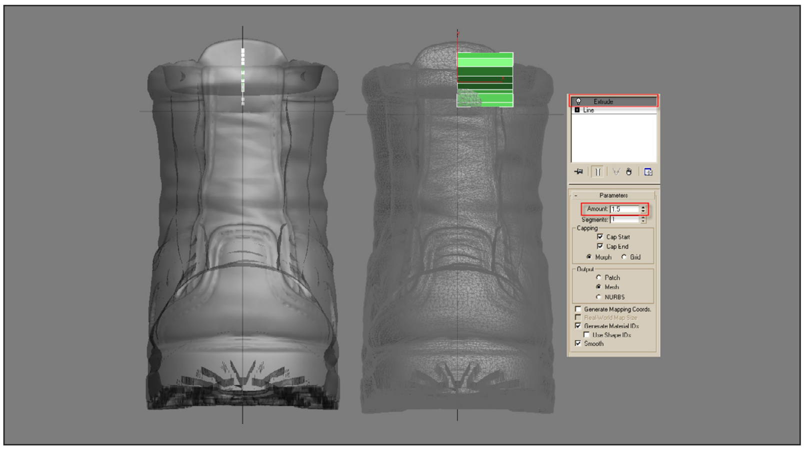


Fig 147

147. Switch to the back view and apply an Extrude modifier. (**Fig.147**)

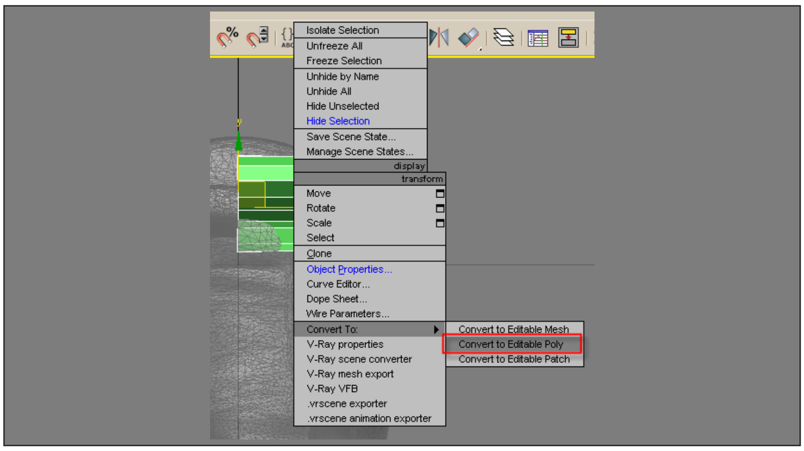
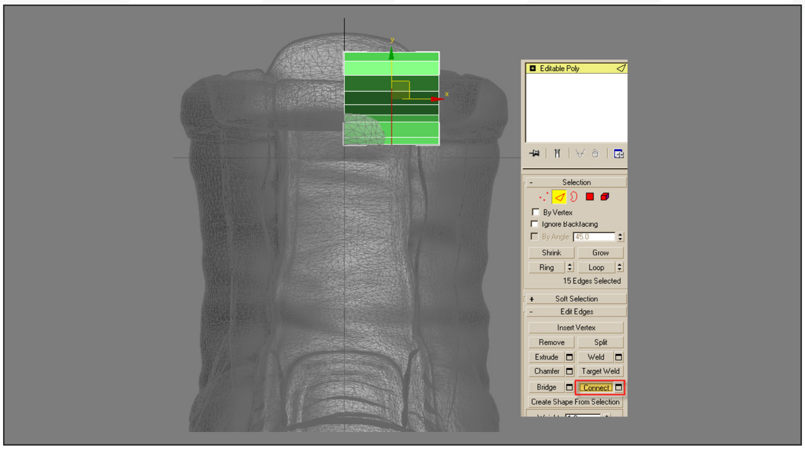


Fig 148

148. Convert it to an Editable poly. (**Fig.148**)

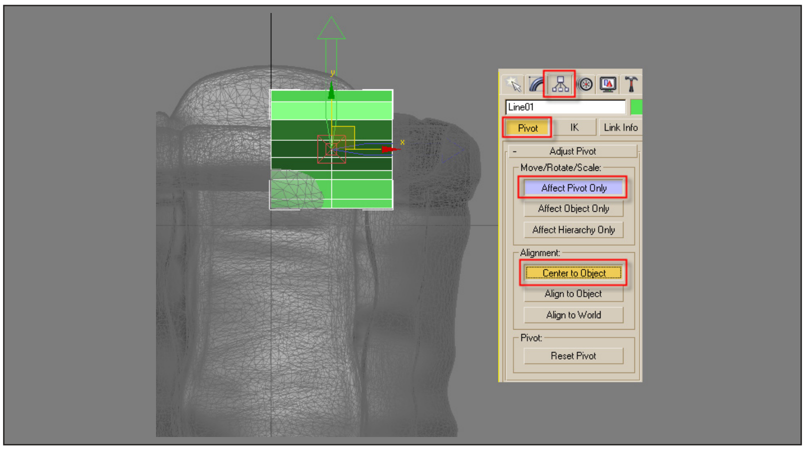
149. Select the horizontal edges and create an edge loop by pressing Connect. (**Fig.149**)

Fig 149



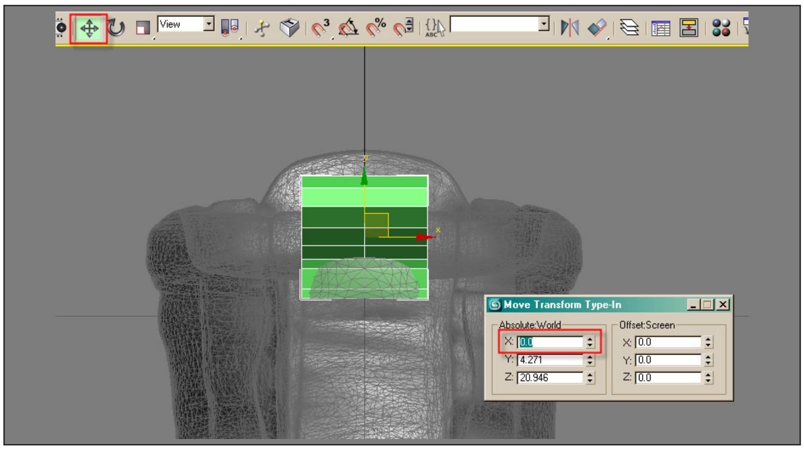
150. Center the object pivot as we have done many times previously. (**Fig.150**)

Fig 150



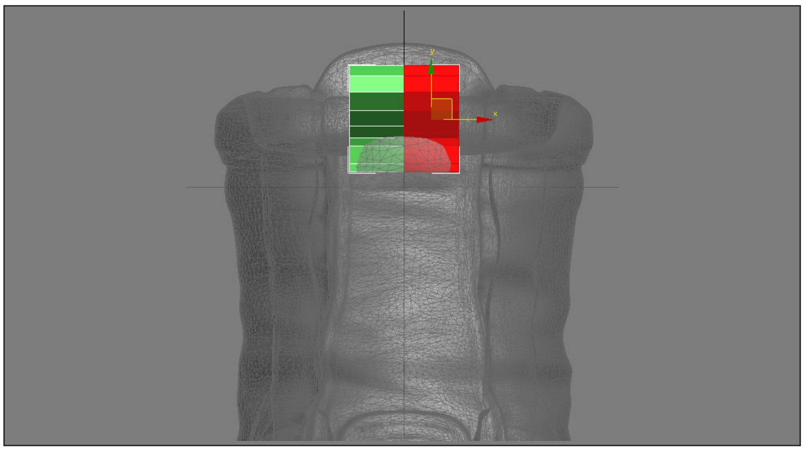
151. Move the object to the center to prepare the Symmetry axis. (**Fig.151**)

Fig 151



152. Select and remove the right side. (**Fig.152**)

Fig 152



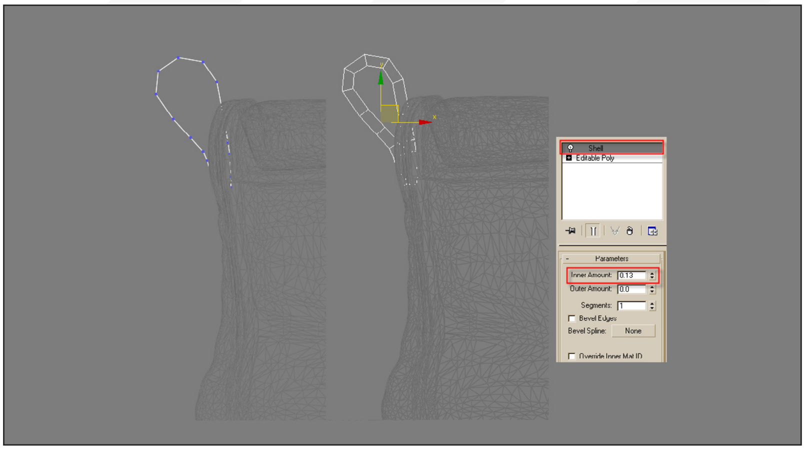


Fig 153

153. Apply a shell modifier to add some thickness. (**Fig.153**)

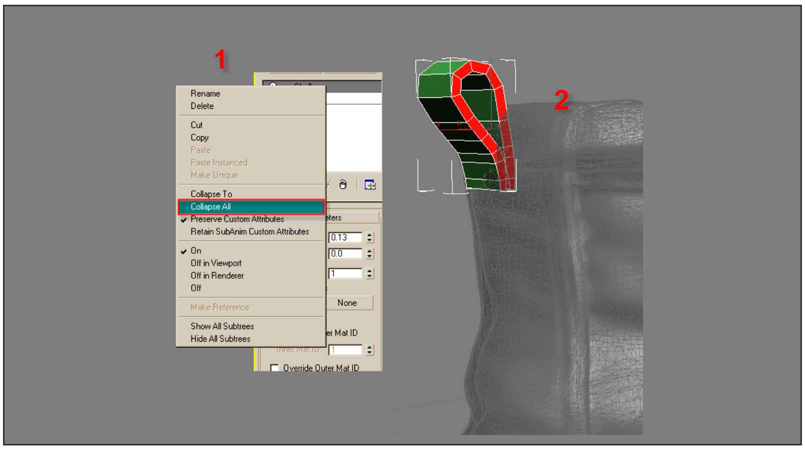


Fig 154

154. Collapse the stack; right click on Shell modifier and Collapse All. To be able to make it symmetrical later remove the created faces in the middle. (**Fig.154**)

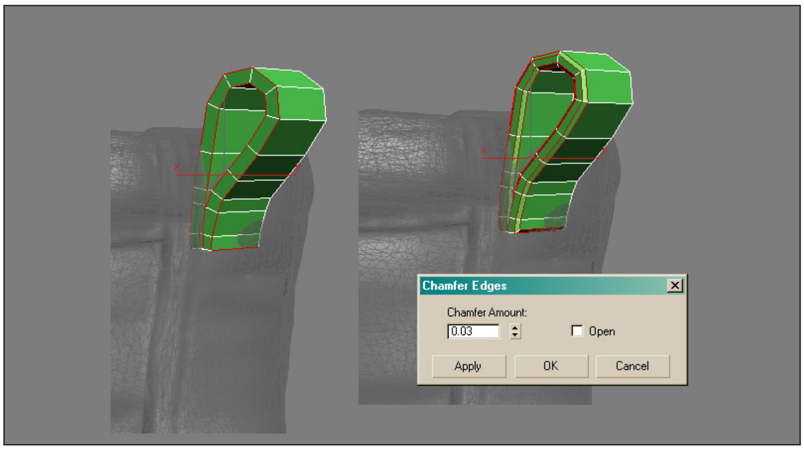


Fig 155

155. Select all the edges except ones on the symmetry axis and press the small button beside the Chamfer button. This button will allow you to select a numerical value to be more accurate during the process. (**Fig.155**)

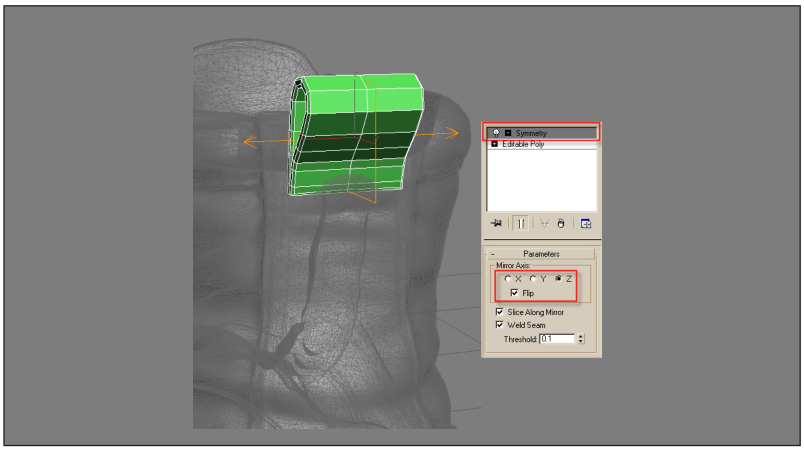
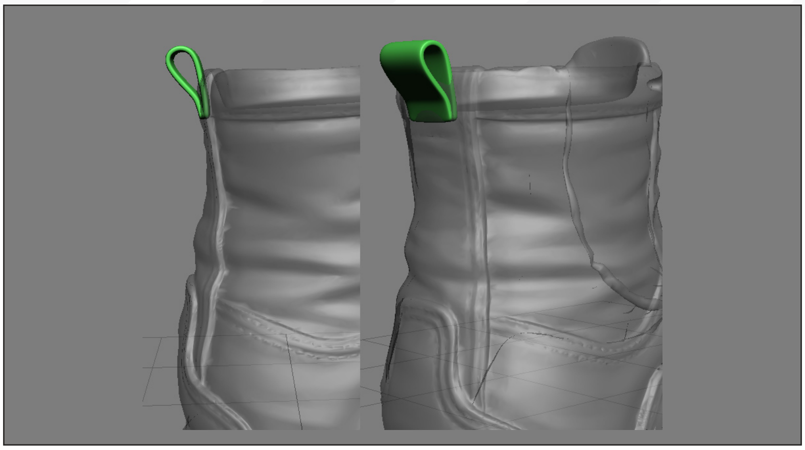


Fig 156

156. You are now ready to create the right part with a Symmetry modifier by changing the mirror axis and once again not forgetting to check the Flip option. (**Fig.156**)

157. Here is a preview of the leather from different angles. (**Fig.157**)

Fig 157



158. Bring this new element in Zbrush (see118) (**Fig.158**)

Fig 158

159. Using the Clay brush push in the surface of the shoe which intersects with the leather piece. (**Fig.159**)

Fig 159

160. Select the new imported object and subdivide it 3 times to add more definition and to be able to sculpt some additional detail. (**Fig.160**)

Fig 160

Fig 161

161. With the same techniques as you used for all the leather pieces on the shoe, add some details. (**Fig.161**)

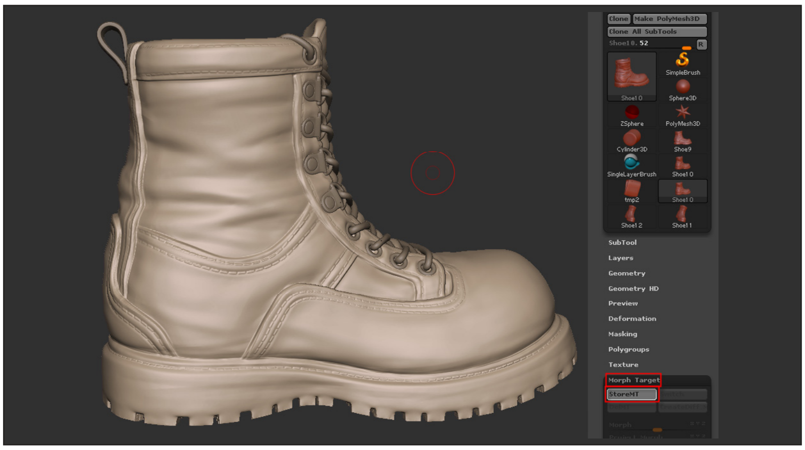


Fig 162

162. Now we are going to do the last detail pass on the shoe. Scroll down to Morph Target, open it and press StoreMT which will store the current stage of your object. (**Fig.162**)

Fig 163

163. Select the standard brush and change the stroke and the alpha as shown below. Then right click in the canvas and change the brush intensity value to 11. (**Fig.163**)

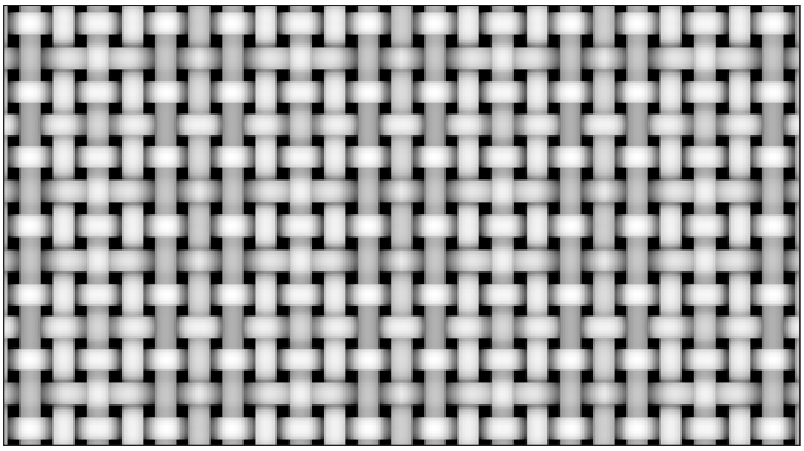
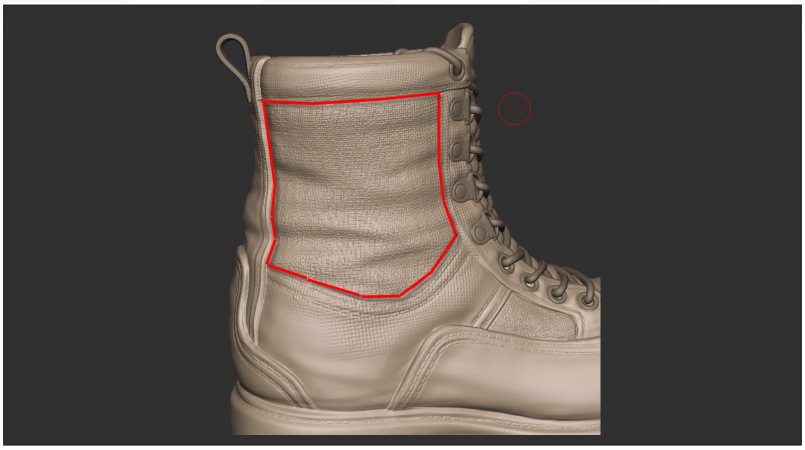


Fig 164

164. Here is the alpha used above. (**Fig.164**)

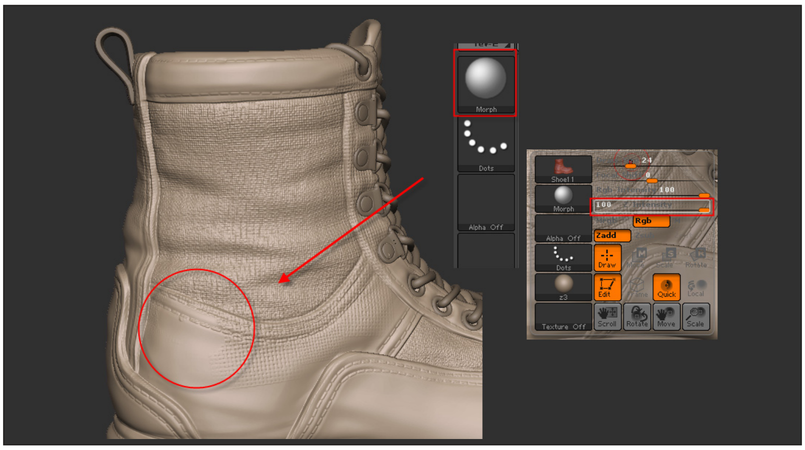
165. Drag and drop the alpha several times into the highlighted area and trying to keep the same alpha scale. Don't worry if you go over the area. (**Fig.165**)

Fig 165



166. Now select the Morph brush and change the intensity value to maximum 100 and paint on the unwanted area. You morph the selected area by the old stored one. (**Fig.166**)

Fig 166



167. Do that for the small area on the side too but below by using the same technique. (**Fig.167**)

Fig 167

168. At this stage the shoe is done but unfortunately, it is too symmetrical so let's ammend that. Open Subtool Master and select Merge which will merge all the visible SubTools into a big one. (**Fig.168**)

Fig 168

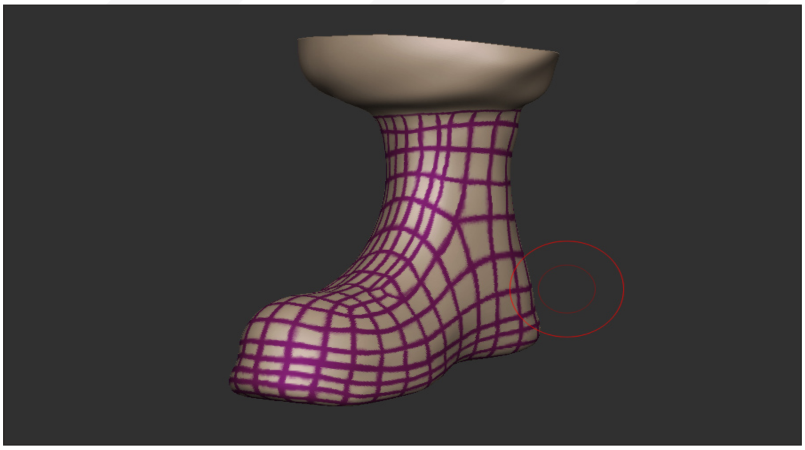


Fig 169

169. Open up an old version of your shoe, the one you used to re-create a good topology. The position, rotation and scale of this one will be used as a reference for the new finished version. (**Fig.169**)

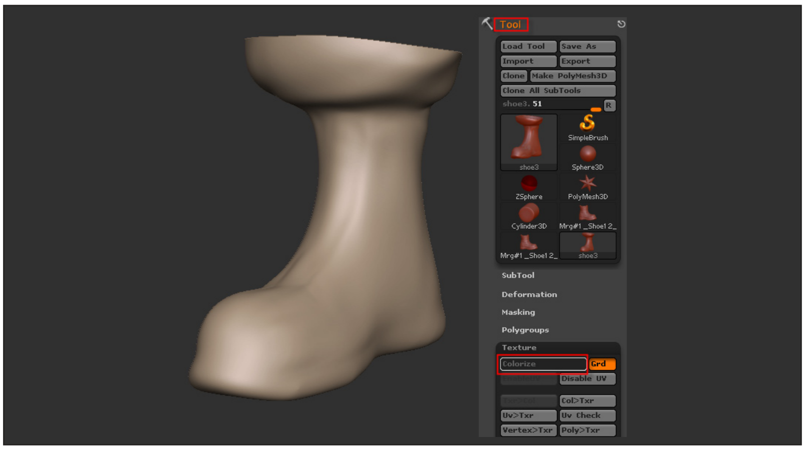


Fig 170

170. Disable colorize to get a better visibility. (**Fig.170**)

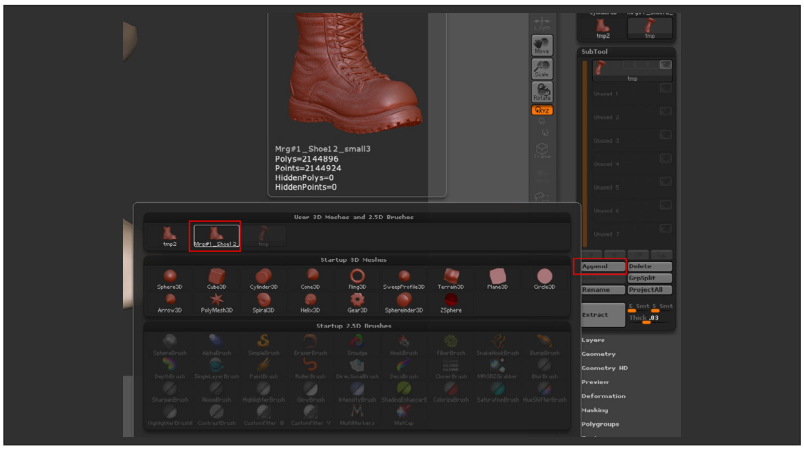


Fig 171

171. Append the Merge shoe version with the one above. (**Fig.171**)

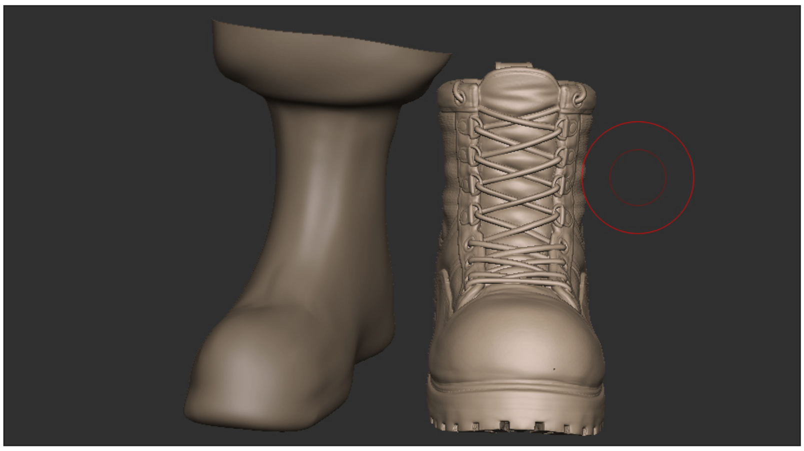
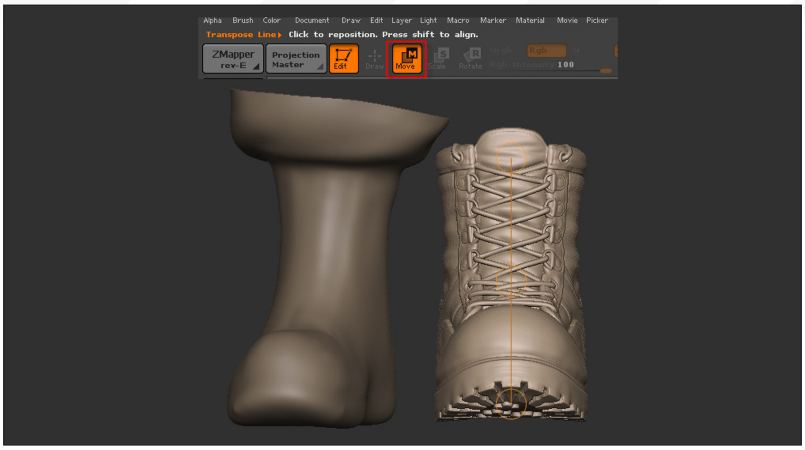


Fig 172

172. Now the two versions are beside one another on the canvas. (**Fig.172**)

173. We are going to use the Transpose function to transform and move the new shoe to match the old one. Drag the three balls as shown below but be sure to keep the line straight by pressing shift each time you move the balls. To move the balls, select the circle line but do not press inside. (**Fig.173**)

Fig 173



174. By pressing and moving inside the ball situated in the middle, move the shoe to the left. (**Fig.174**)

Fig 174

175. Change the balls position in the top view, press rotate and by selecting and moving the ball in the front of the shoe; rotate it to match the one underneath. (**Fig.175**)

Fig 175

176. Do this several times to match the old mesh as best as possible. (**Fig.176**)

Fig 176

Fig 177

177. With the move Brush, move some areas to fit more with the reference underneath. (**Fig.177**)

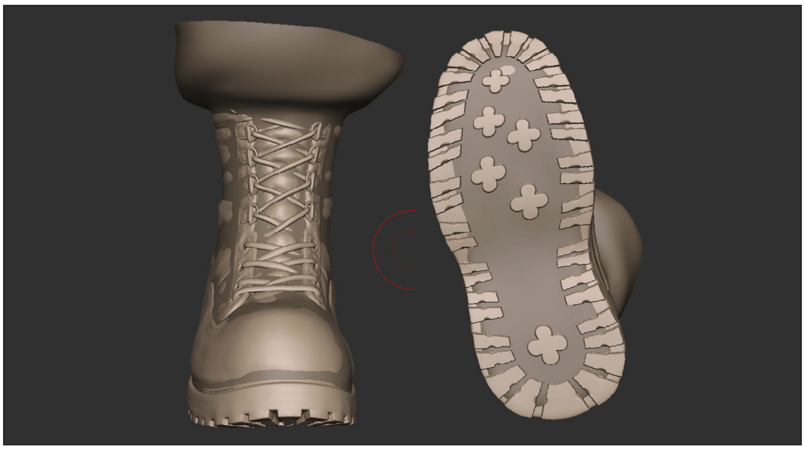


Fig 178

178. Here are the results from different angles. (**Fig.178**)

Fig 179

179. And here is the final shoe. (**Fig.179**)

Fig 180

180. Let's finish with a beauty render inside ZBrush. (**Fig.180**)

chapter 03

Handgun (Hard-Edge Max/Silo)

CHAPTER 03 - GUN (HARD-EDGE MODELING)

Software Used: ZBrush, 3ds Max, Silo, and Photoshop

INTRODUCTION

In the following chapter, we are going to see the step by step progress used to create a Handgun. The technique used is not complicated, we just need to know how to use a couple of functions in 3dsmax and have some patience and good references.

Fig 01

Image Copyright © Realaction.de, http://www.realaction.de

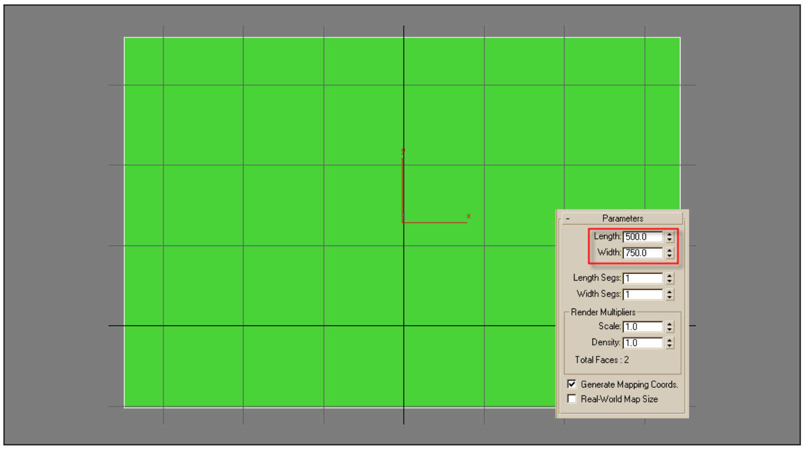
1-2. The first step is to gather reference material. Google is probably the best friend you could have on the internet. For this character I chose a Desert Eagle. Try to find references from different angles and especially the side view which will be very important in creating the main shape. (**Fig.01 – 02**)

Fig 02

Image Copyright © Realaction.de, http://www.realaction.de

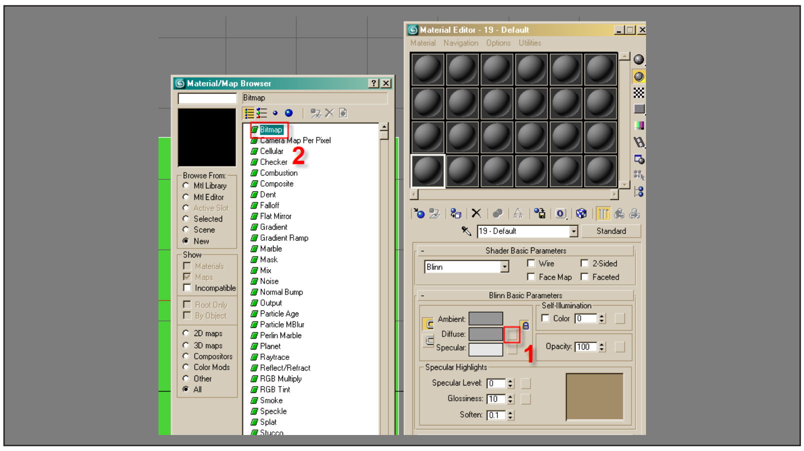
3. In the front viewport, create a plane with the same length and width as your reference picture. (**Fig.03**)

Fig 03



4. Open the Material Editor by pressing M hotkey and select a slot in the new window. Then click on the square button beside Diffuse and a new pop-up appears. Select Bitmap and choose your reference picture. (**Fig.04**)

Fig 04



5. Once your reference picture is loaded, apply the material to your object (1) and display the picture in the viewport (2). (**Fig.05**)

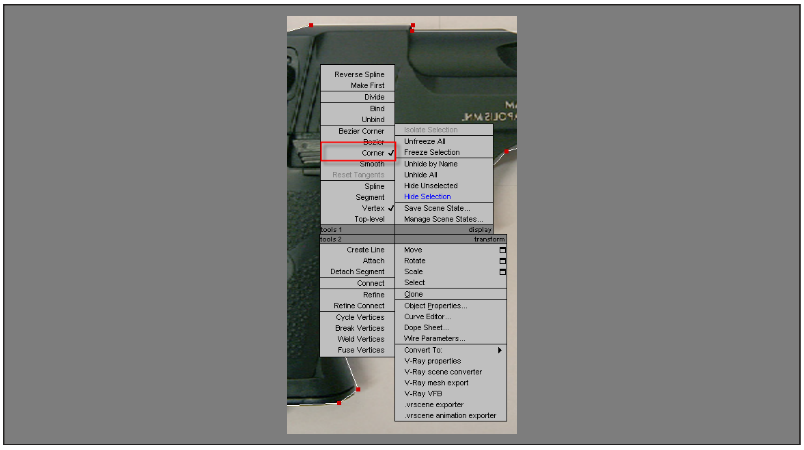
Fig 05

6. Create a line around the gun as you did in chapter 2 (see 146). (**Fig.06**)

Fig 06

7. Select all the vertices, right click to display the pop-up menu and select Corner. It's really important because we are going next to work with an Editable Poly so do not need any Bezier information. (**Fig.07**)

Fig 07



8. Convert to an Editable Poly and you have a big polygon with n-gons. (**Fig.08**)

Fig 08

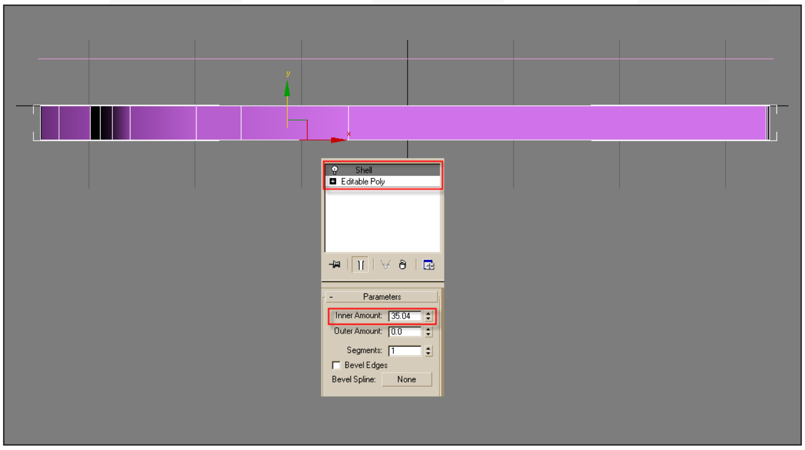


Fig 09

9. Add a Shell modifier to create some thickness. (**Fig.09**)

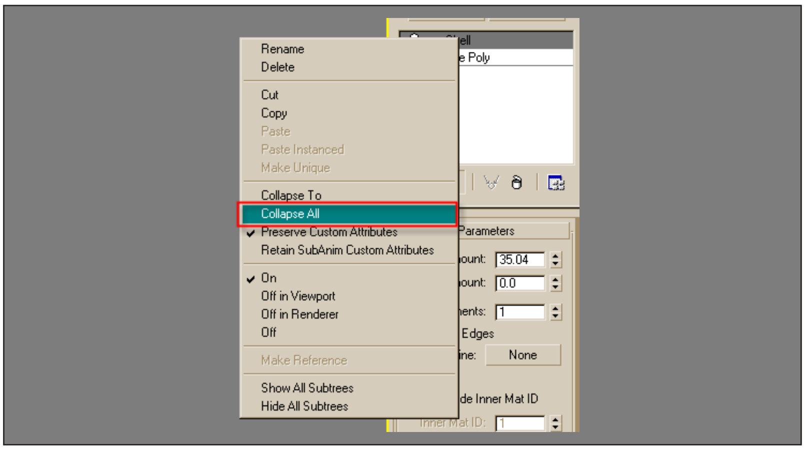


Fig 10

10. Collapse the stack by right clicking on Shell - Collapse All. (**Fig.10**)

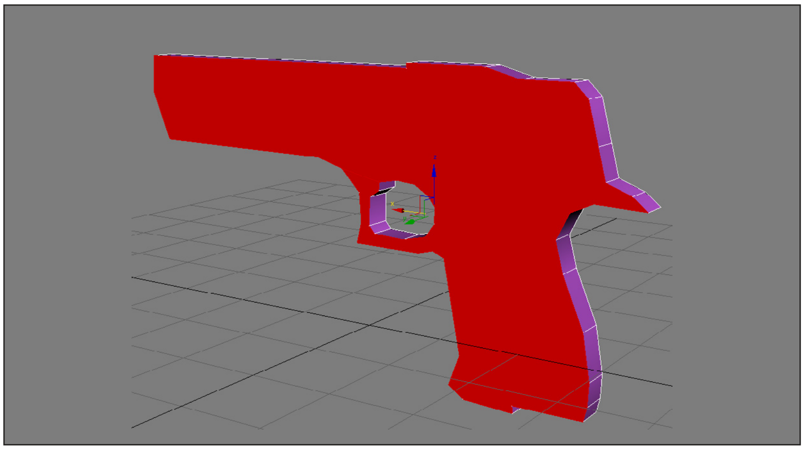


Fig 11

11. Don't forget do remove the face at the back where the Symmetry axis will be situated. (**Fig.11**)

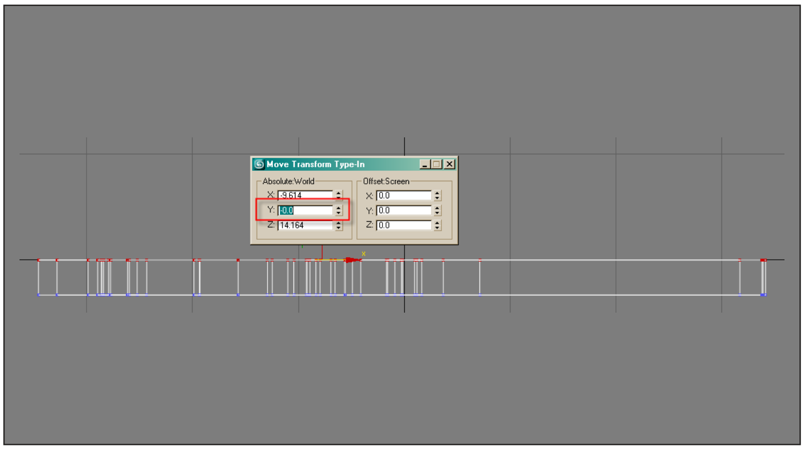


Fig 12

12. As we often did with the previous chapters, select all the vertices at the back from within the top view. Right click on the Move button and change the Y value to align them correctly along the symmetrical axis. (**Fig.12**)

13. Here is the result so far in the side view. (**Fig.13**)

Fig 13

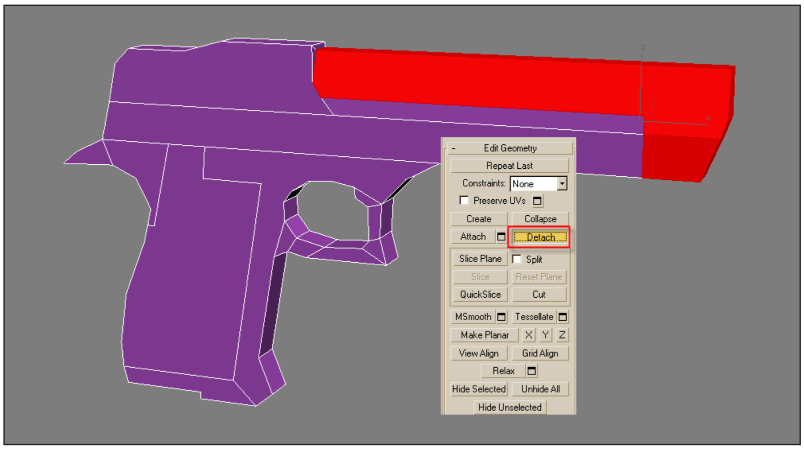
14-15. Select the object and then press Alt+X and it will become transparent, allowing you to use the reference picture as a guide. With the Cut function, add some sections as shown below. Just press Alt+X again if you want to view your object as in the previous preview. (**Fig.14 – 15**)

Fig 14

Fig 15

16. We are going now to detach the different elements that we are going to work on separately. Let's detail the procedure for just one section as it will be the same for all. Detach the chosen section as shown below. (**Fig.16**)

Fig 16



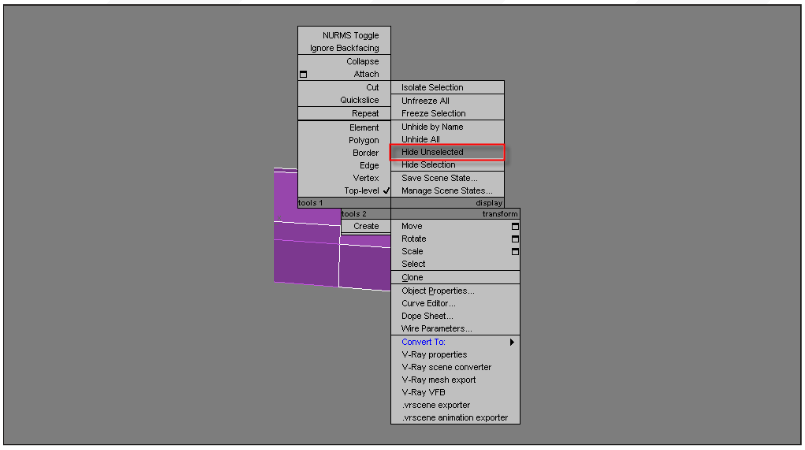


Fig 17

17. You now have a new object in the scene. (**Fig.17**)

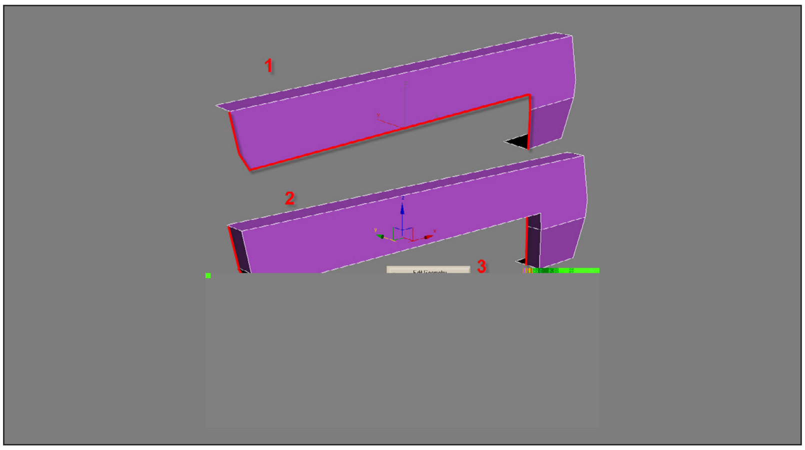


Fig 18

18. Select the open area along the bottom and whilst pressing Shift, move them to the left in order to extrude them. Then press Y to align the new edges together. (**Fig.18**)

Fig 19

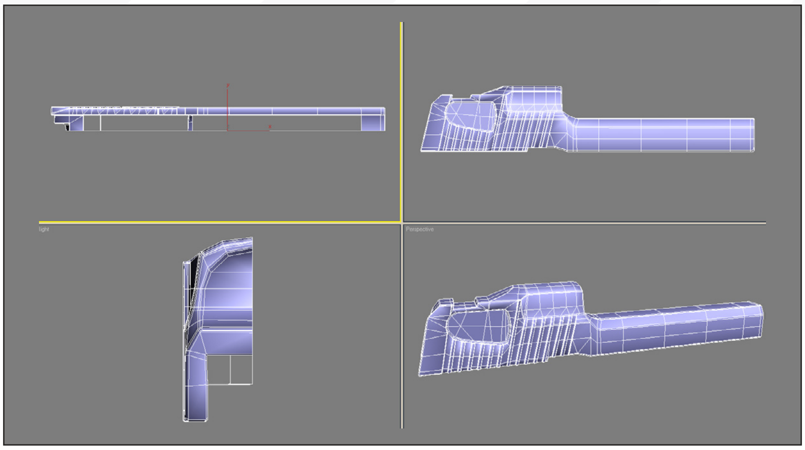
19. As we have often done during the last two chapters, right click on the Move transformation button to show the numerical parameters and change the Y value to 0 to align the edges along the symmetrical axis. (**Fig.19**)

Fig 20

20. Now select all the vertices and press the square box beside Weld, changing the value in the new window to 1. This will weld all the vertices that occupy the same position. (**Fig.20**)

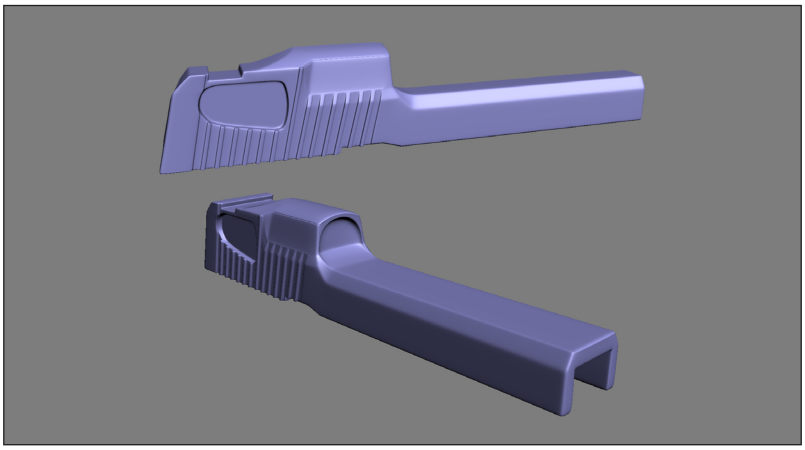
77. Some more screenshots to help you target difficult areas. (**Fig.77**)

Fig 77



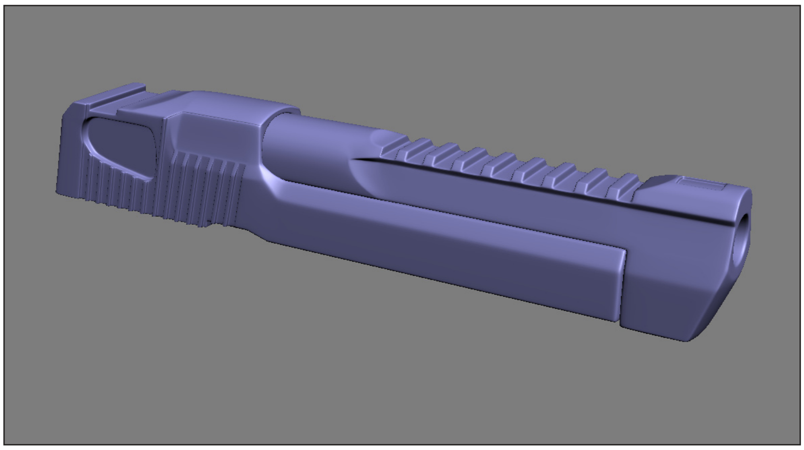
78. The final object after smoothing. (**Fig.78**)

Fig 78



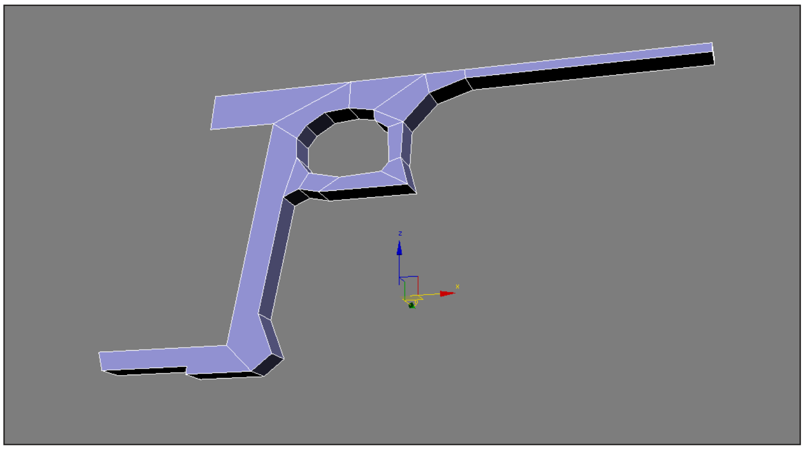
79. Add the barrel to see how they work together. (**Fig.79**)

Fig 79



80. The pistol handle. (**Fig.80**)

Fig 80



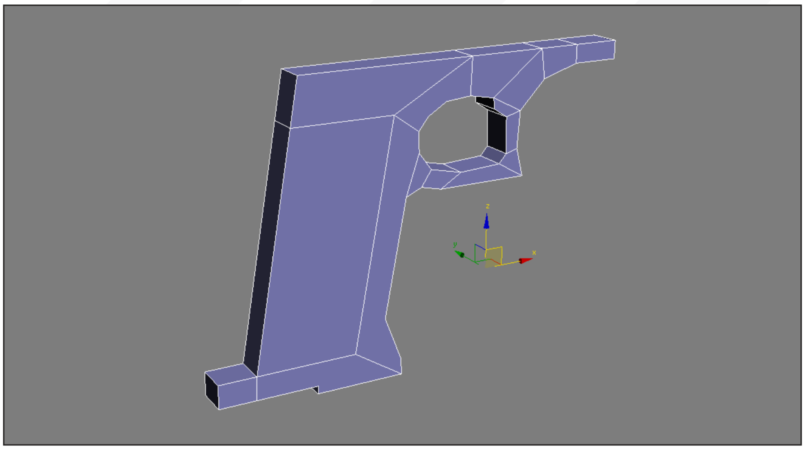


Fig 81

81. The same kind of preliminary cut as we did above to shape the main volume. (**Fig.81**)

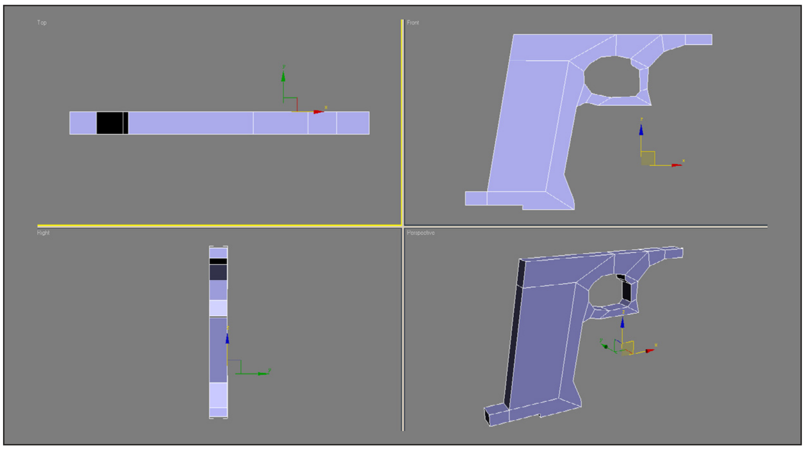


Fig 82

82. Some more views. (**Fig.82**)

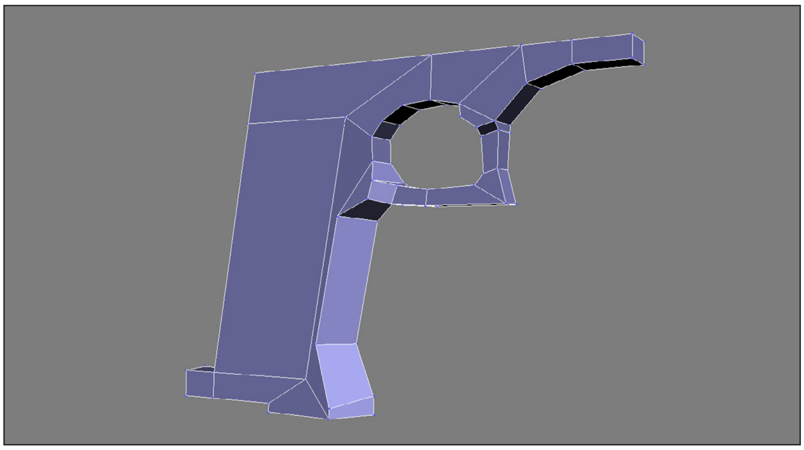


Fig 83

83-84-85. Try to keep quads as much as possible. (**Fig.83 – 85**)

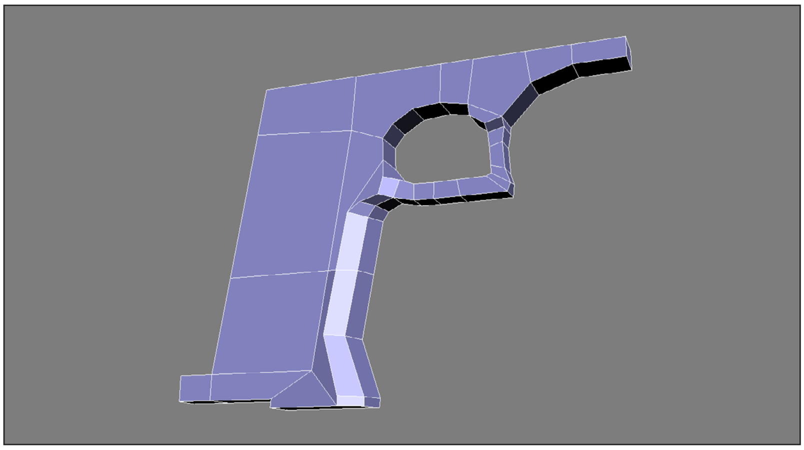
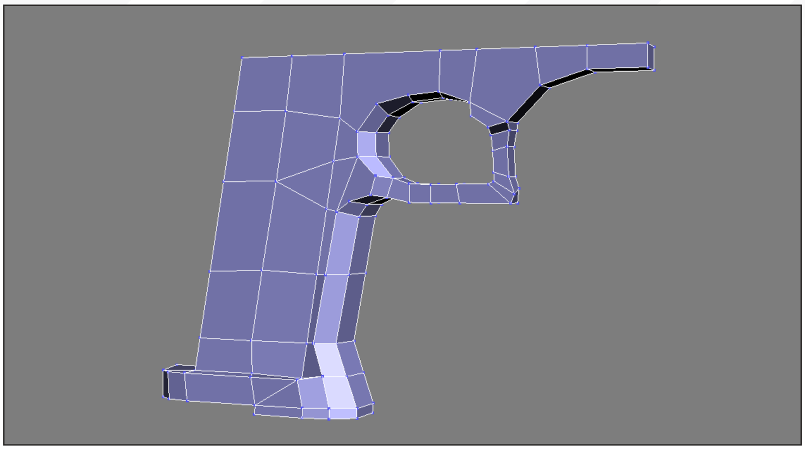


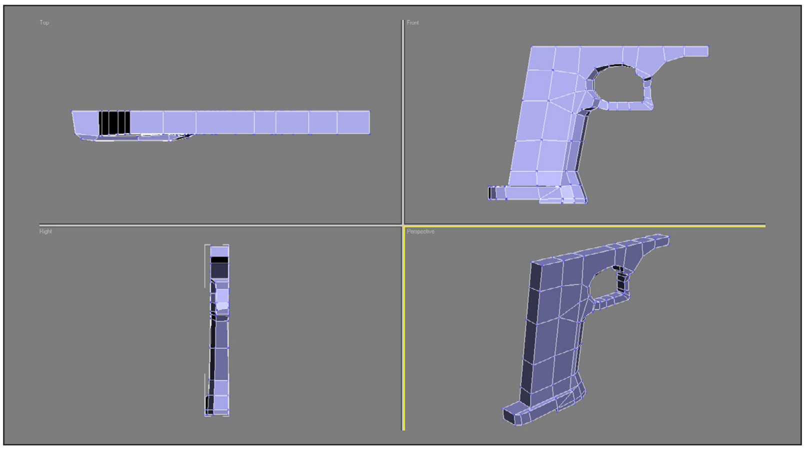
Fig 84

Fig 85



86. Current stage. (**Fig.86**)

Fig 86



87-88. Prepare and remove an area to make way for inserting an object later. (**Fig.87 – 88**)

Fig 87

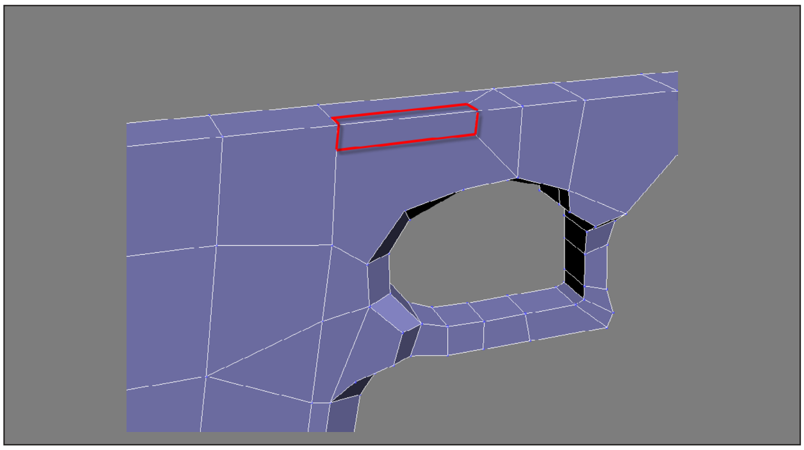
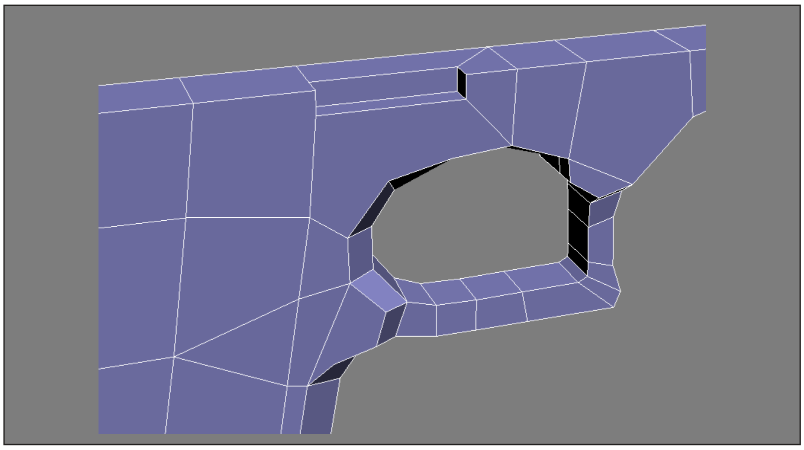


Fig 88



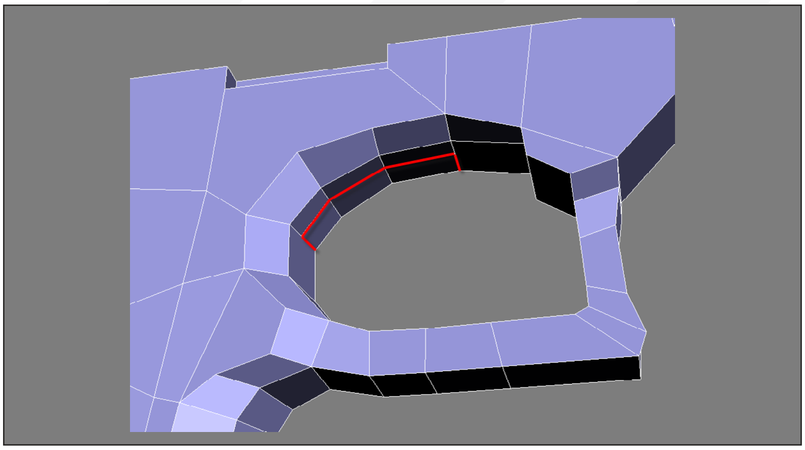


Fig 89

89-90. Prepare and extrude a hole for the trigger. (**Fig.89 – 90**)

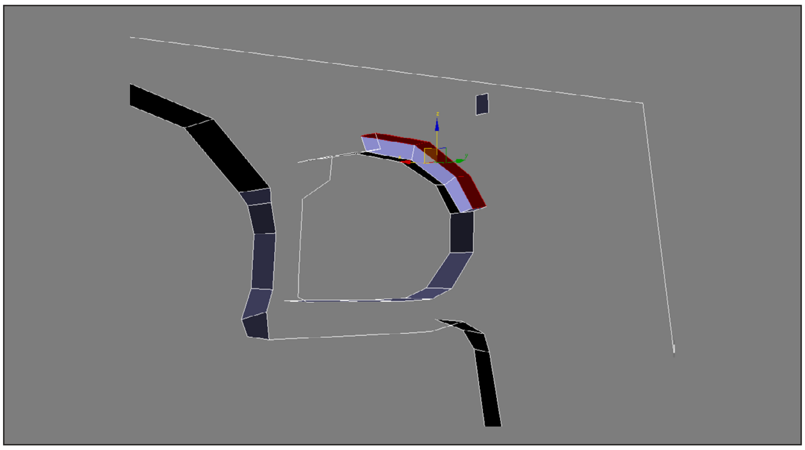


Fig 90

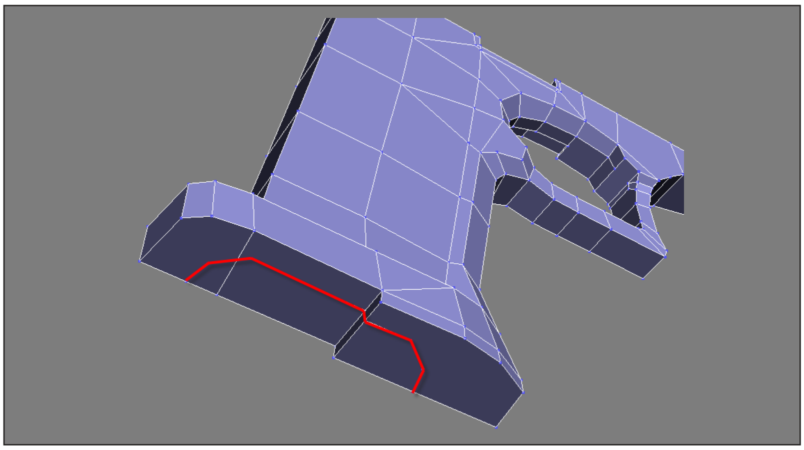


Fig 91

91-92-93. Do the same for the magazine. (**Fig.91 – 93**)

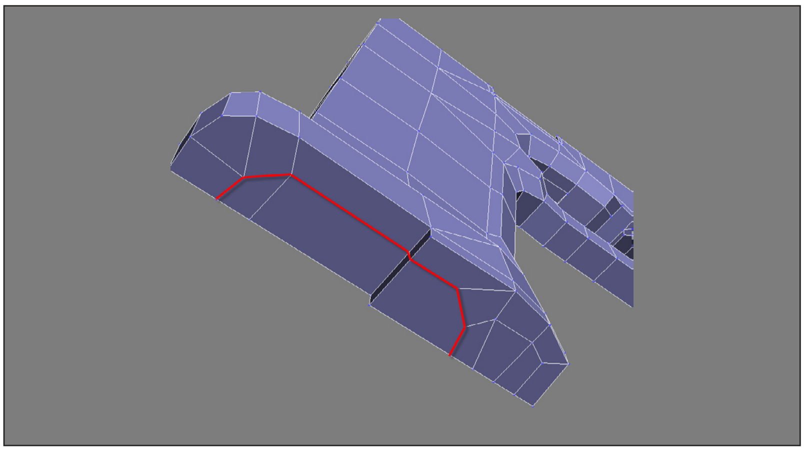
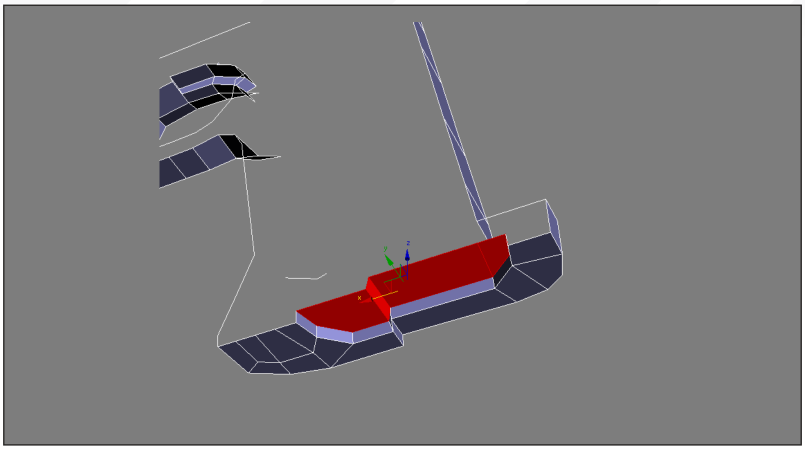


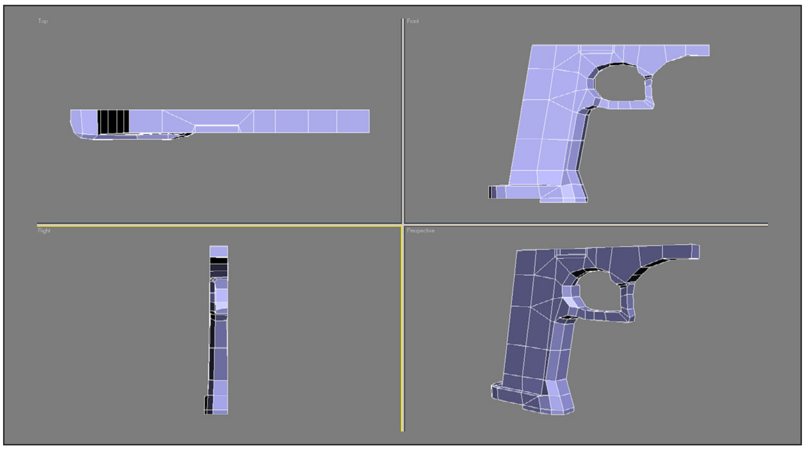
Fig 92

Fig 93



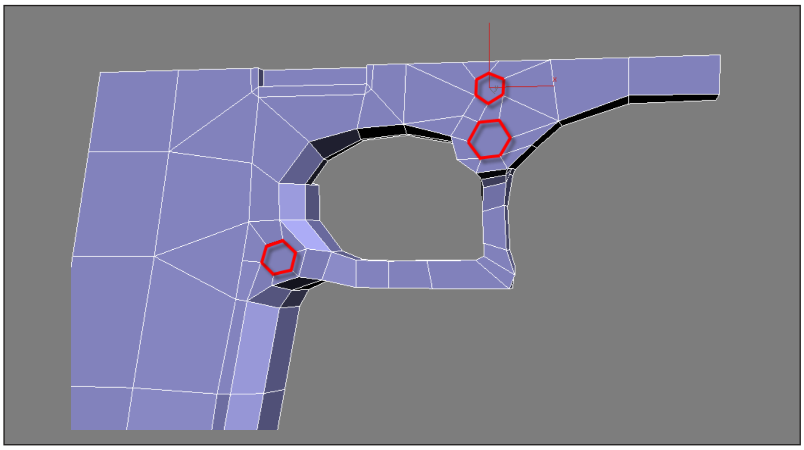
94. A current preview. (**Fig.94**)

Fig 94



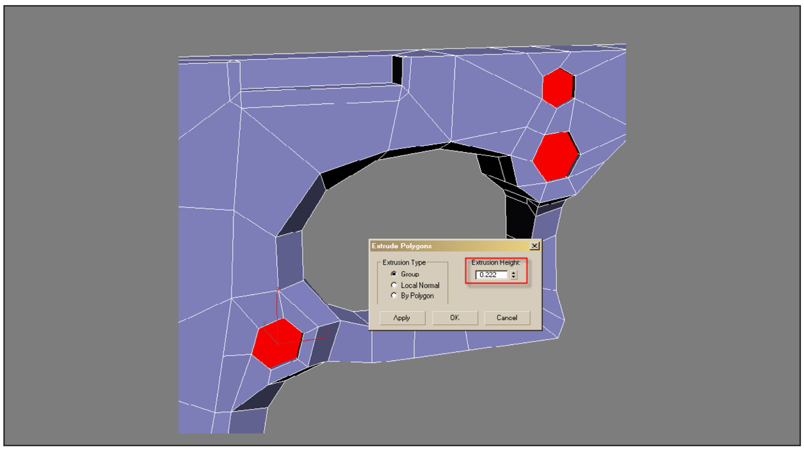
95. Now let's add some buttons on the piece by cutting some hexagons in the front view. (**Fig.95**)

Fig 95



96-97-98-99-100. Using the following steps, create the buttons. (**Fig.96 – 100**)

Fig 96



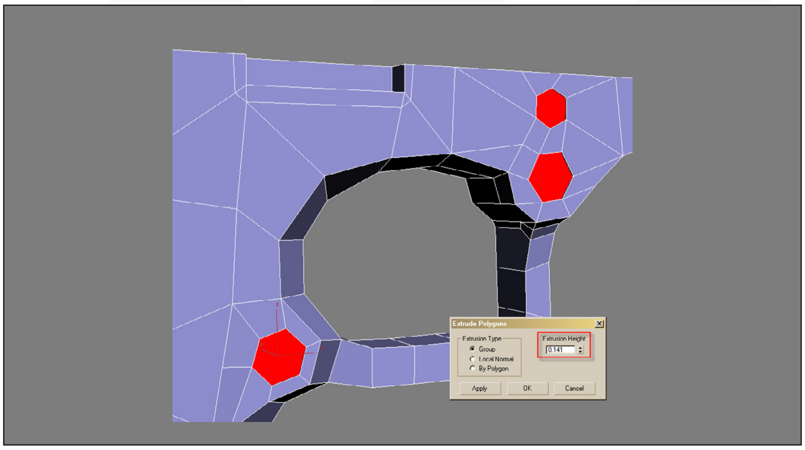


Fig 97

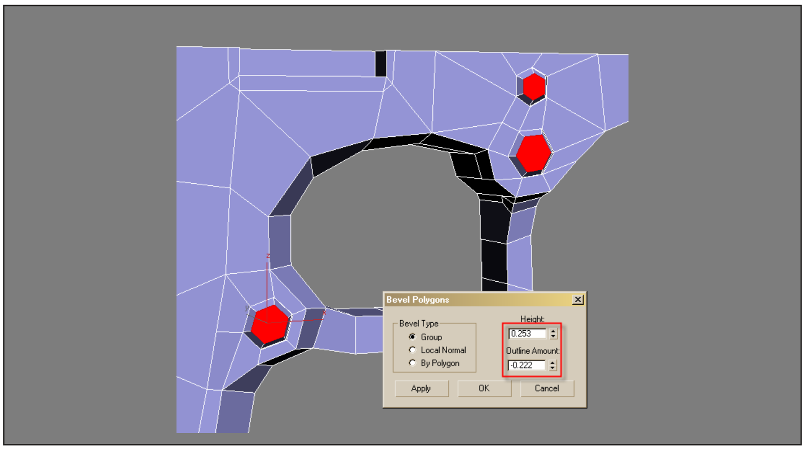


Fig 98

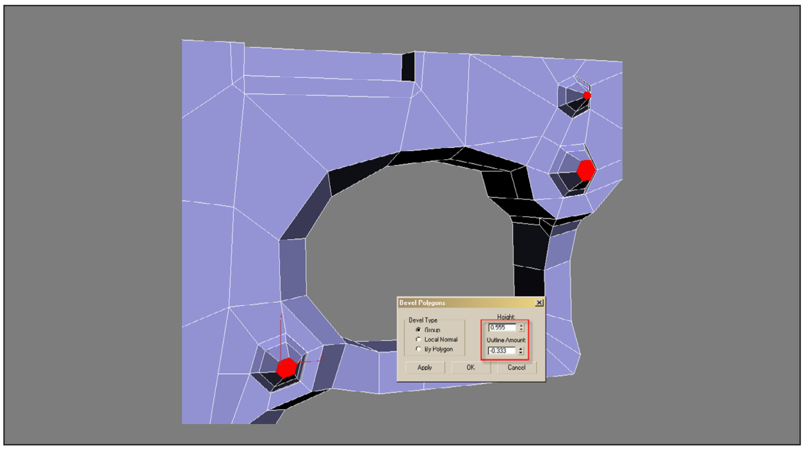


Fig 99

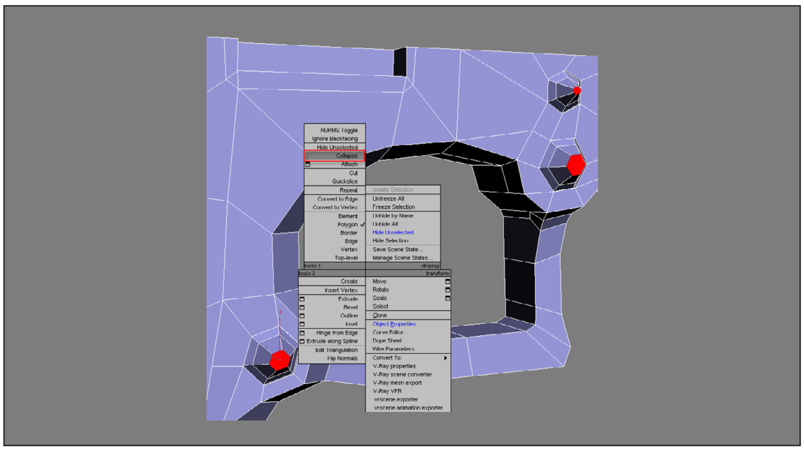
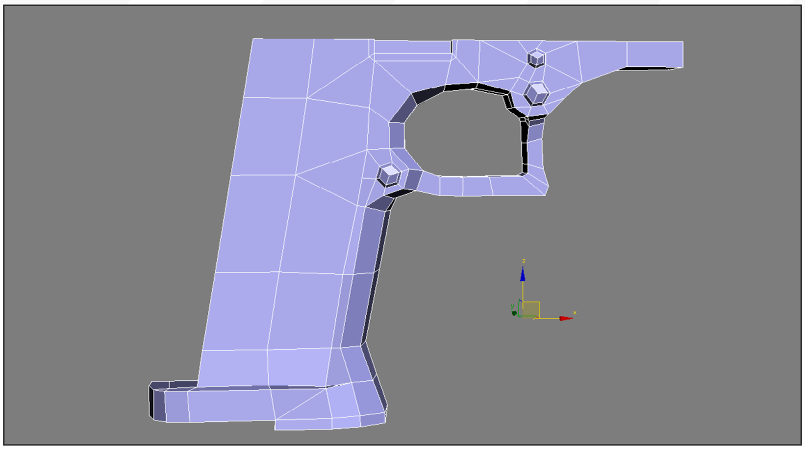


Fig 100

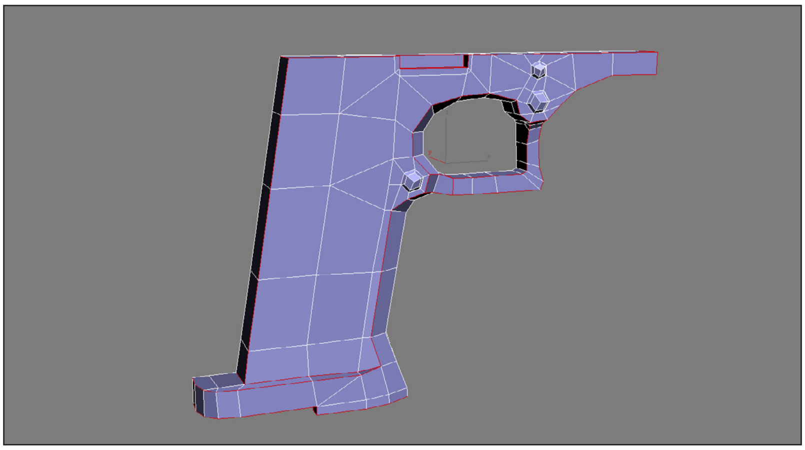
101. Preview of the buttons after the faces are collapsed. (**Fig.101**)

Fig 101



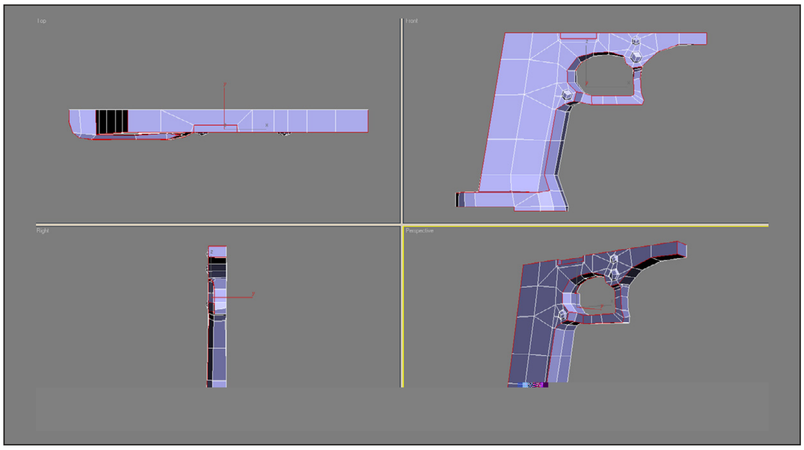
102. Now it's time now to select the edges to chamfer. (**Fig.102**)

Fig102



103. Here they are from several angles. (**Fig.103**)

Fig103



104-105. Here is a preview of the chamfered edges and final object. (**Fig.104 – 105**)

Fig 104

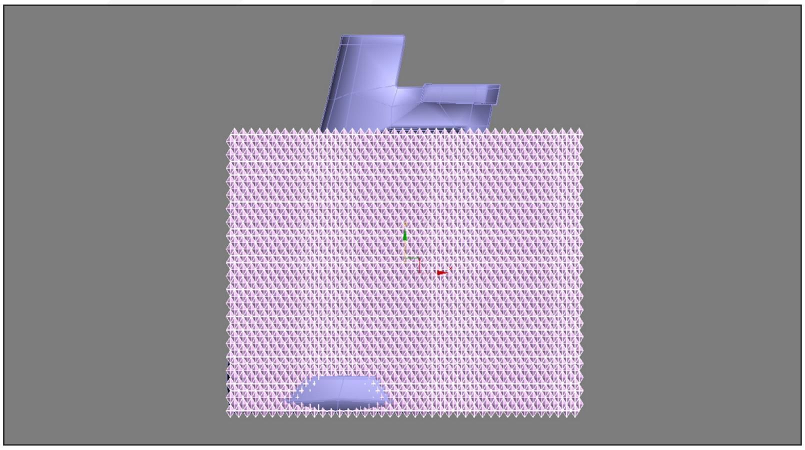


Fig 129

129. Display the recent handgun piece and move you square pattern to cover the grip area. (**Fig.129**)

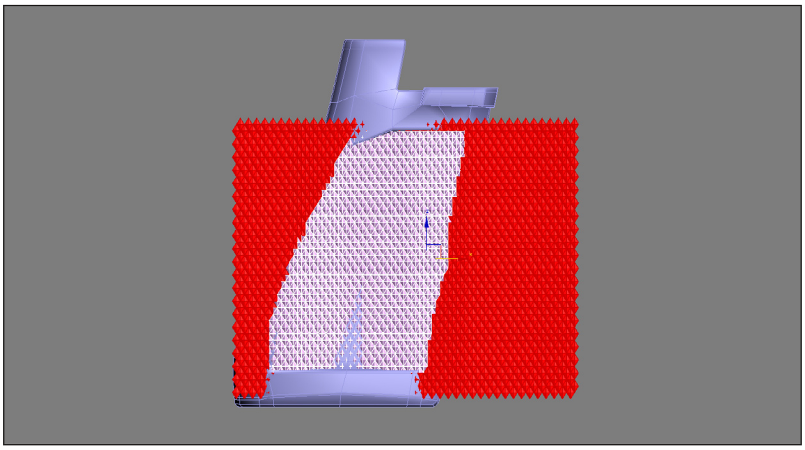


Fig 130

130- 131. Select the faces within the grip area and delete them. (**Fig.130 – 131**)

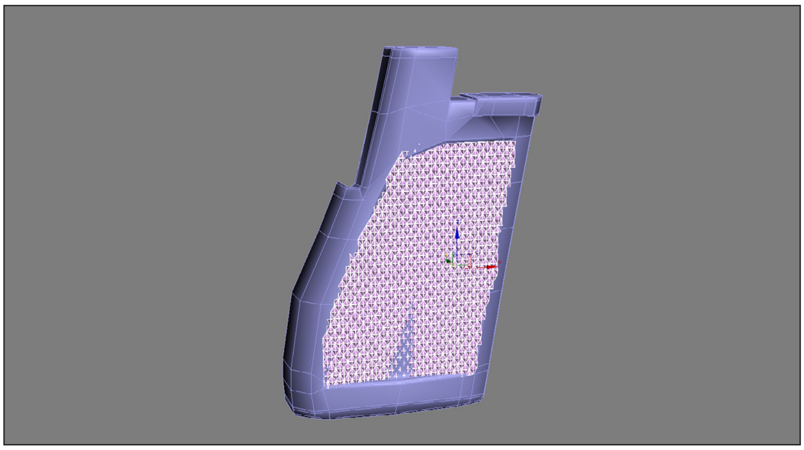


Fig 131

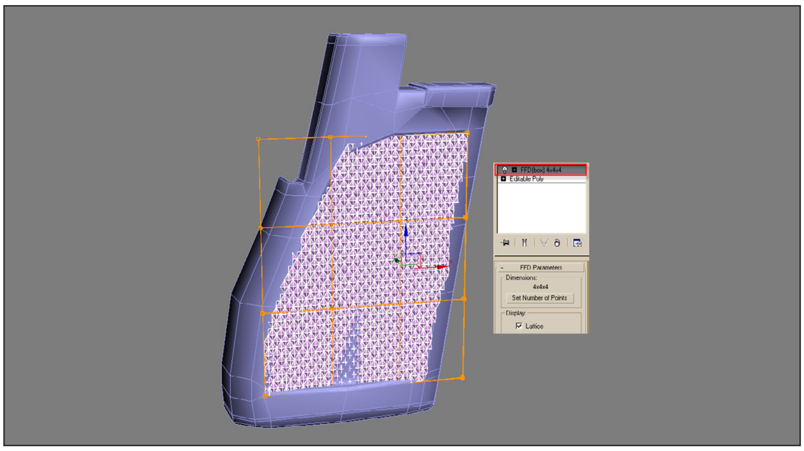
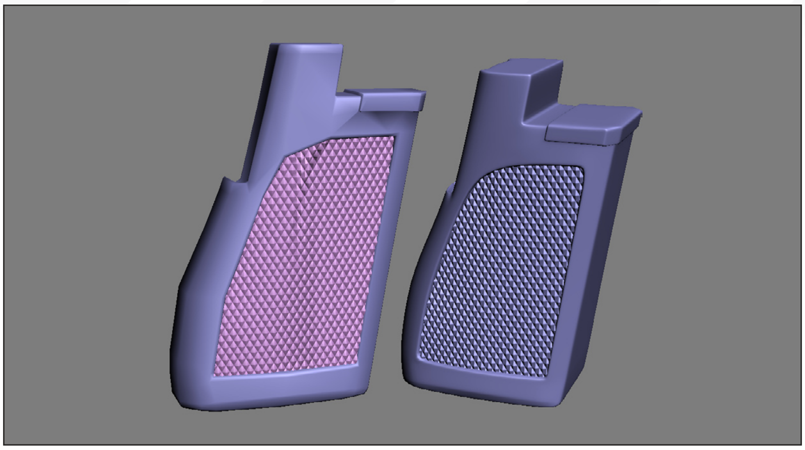


Fig 132

132. Now apply an FFD (box) 4x4x4 modifier to bend and move the grip pattern into its corresponding area. (**Fig.132**)

133. Here is the final preview with both a Symmetry and Meshsmooth modifier applied. (**Fig.133**)

Fig 133

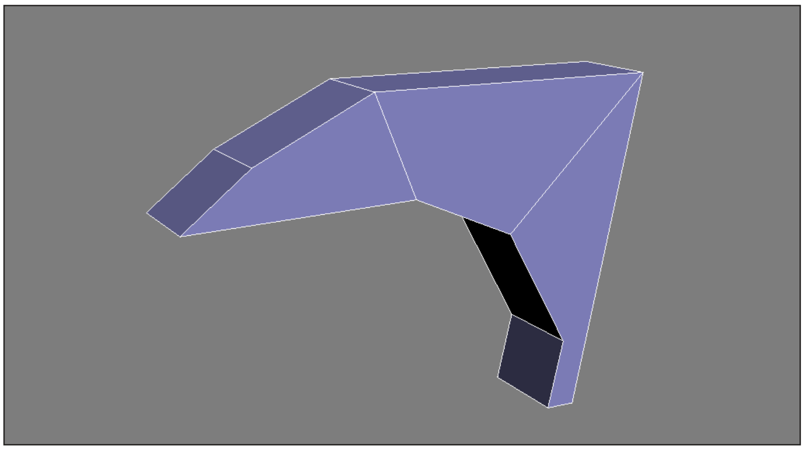


134. Here is the current stage of the handgun along with the grip. (**Fig.134**)

Fig 134

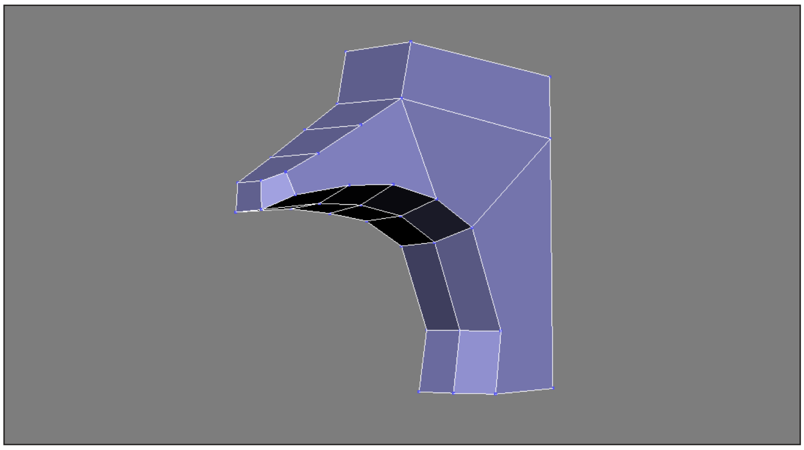
135. Now for the last big piece. (**Fig.135**)

Fig 135



136-137. Add some cuts to create more definition. (**Fig.136 – 137**)

Fig 136



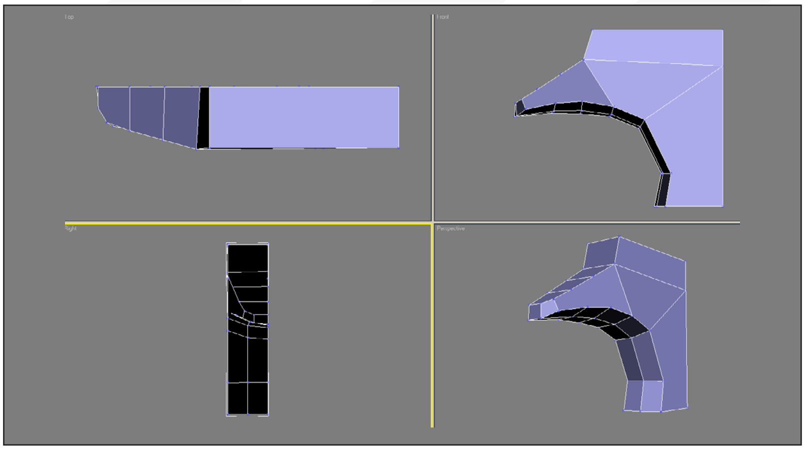


Fig 137

138. To prepare a hole, cut the area as shown below. At the same time fix any potential n-gons. (**Fig.138**)

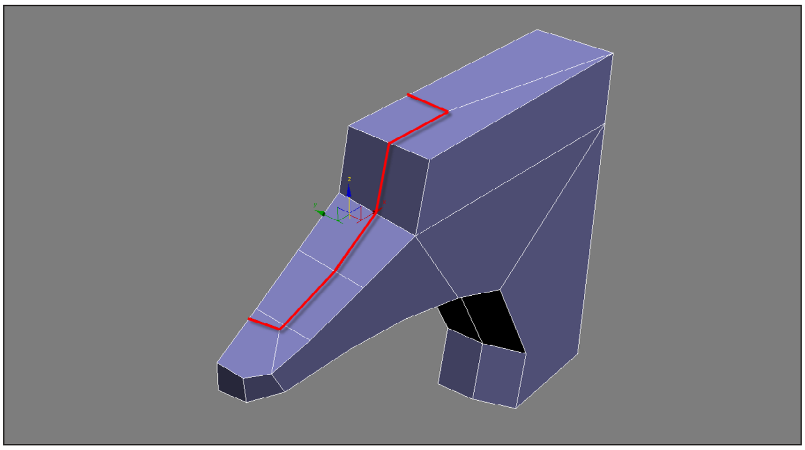


Fig 138

139. Extrude the area. (**Fig.139**)

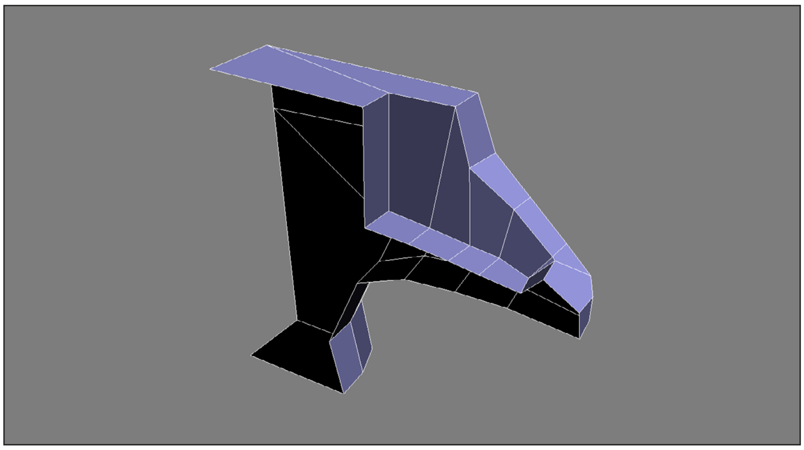


Fig 139

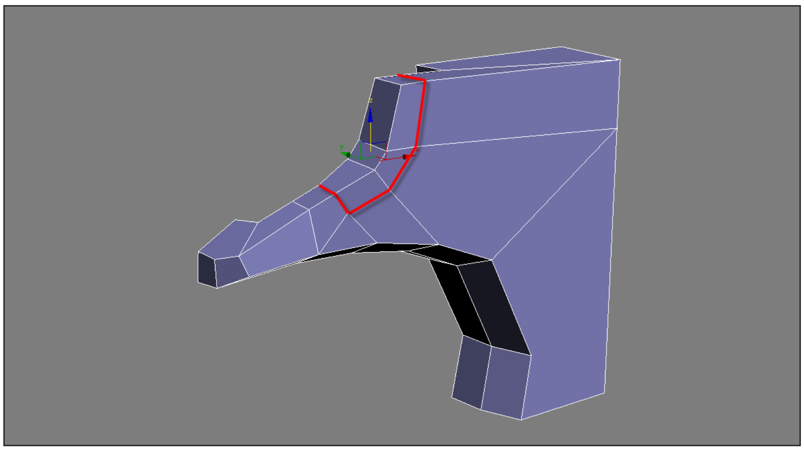
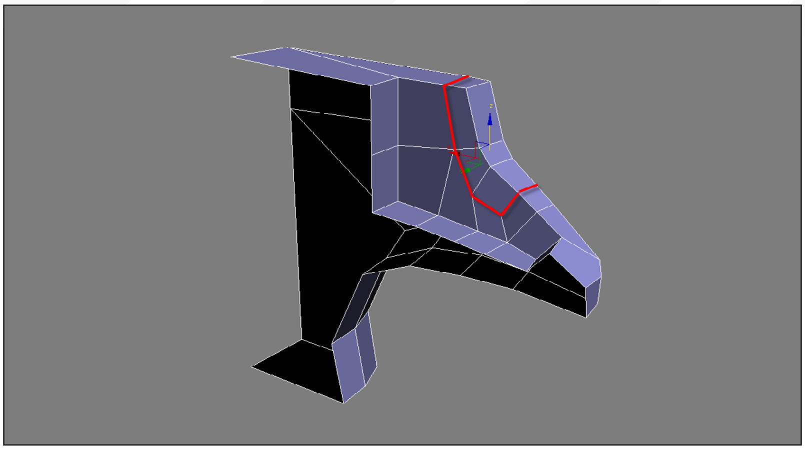


Fig 140

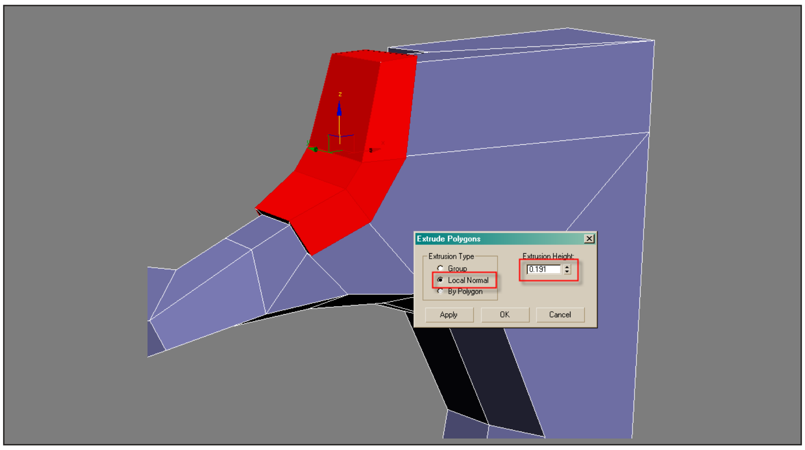
140-141. Prepare another area for extrusion. (**Fig.140 –141**)

Fig 141



142. Extrude the area. (**Fig.142**)

Fig 142



143-144. Do the same on the right to match the reference. (**Fig.143 – 144**)

Fig 143

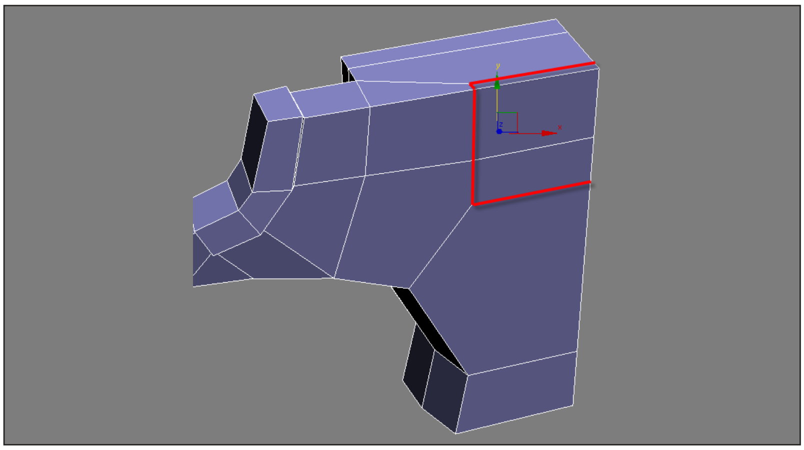
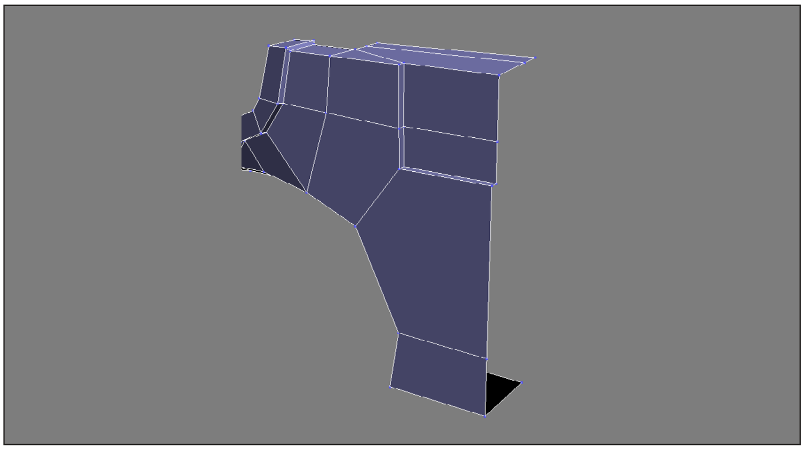


Fig 144



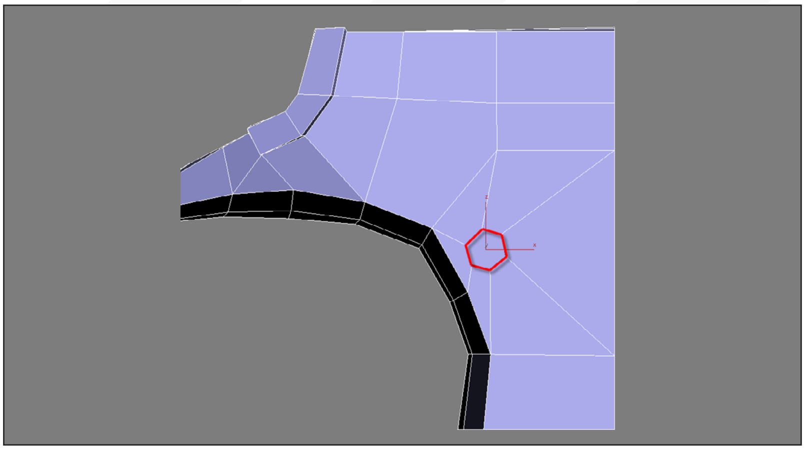


Fig 145

145- 146. As you did for the piece at the front, cut in a hexagon in order to form a button. (See 95-100). (**Fig.145 –146**)

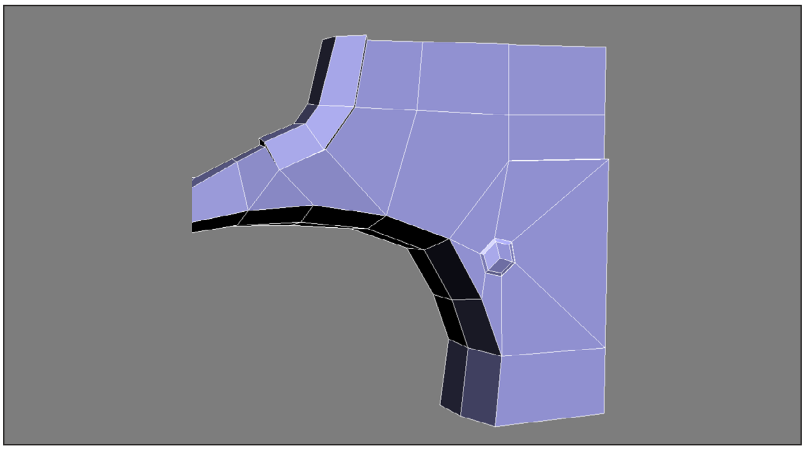


Fig 146

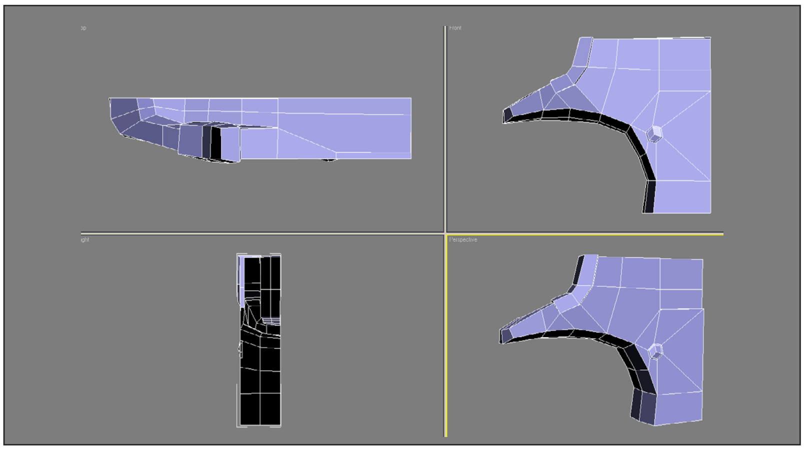


Fig 147

147. Some more angles. (**Fig.147**)

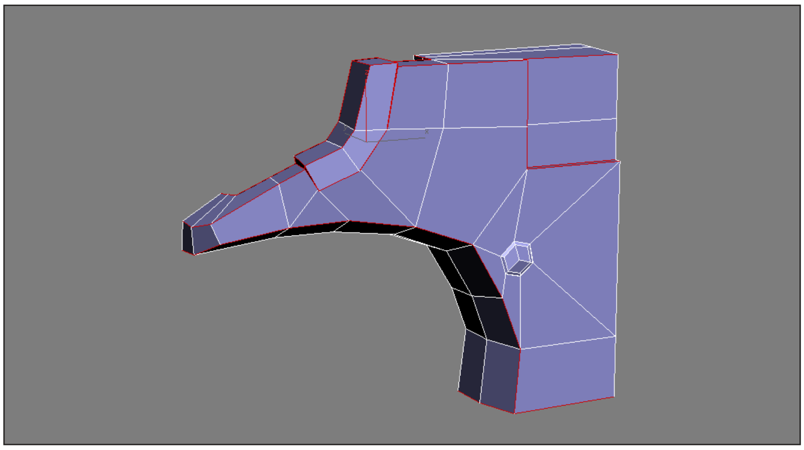


Fig 148

148-149-150. Select the appropriate edges and chamfer them. (**Fig.148 – 150**)

Fig 149

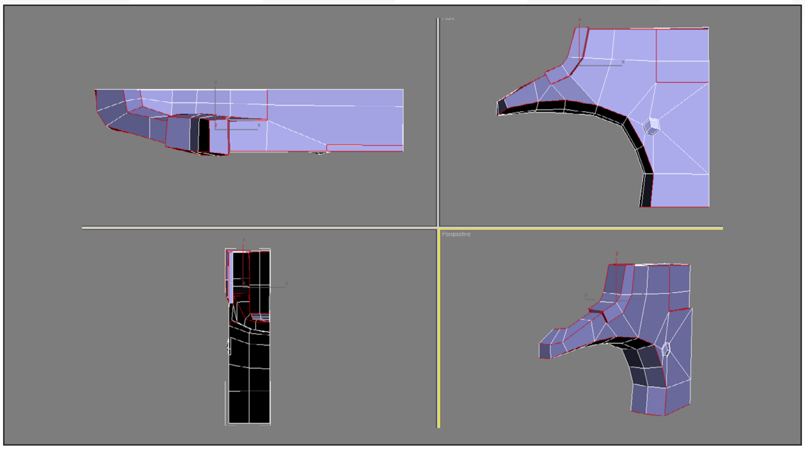
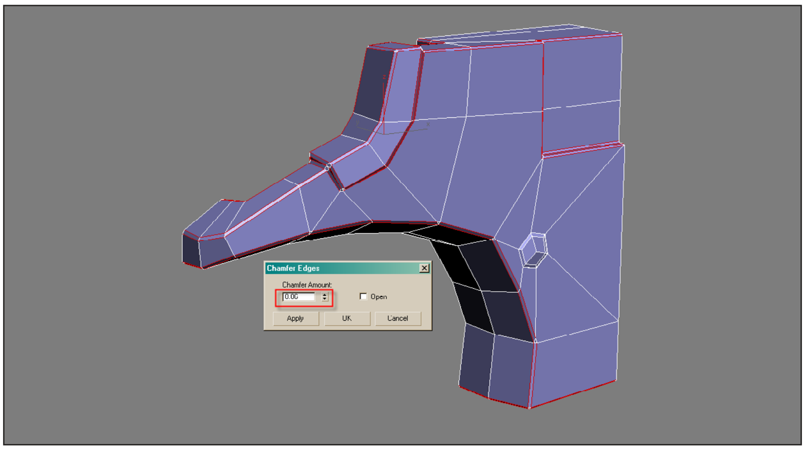


Fig 150



151- 152. A final preview. (**Fig.151 – 152**)

Fig 151

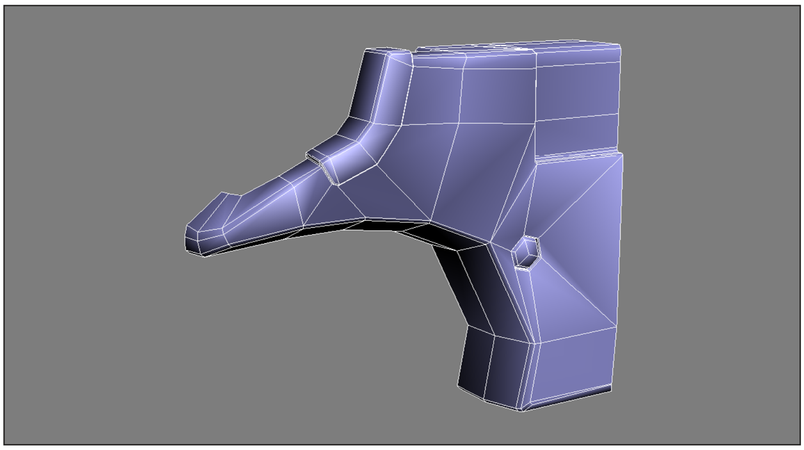
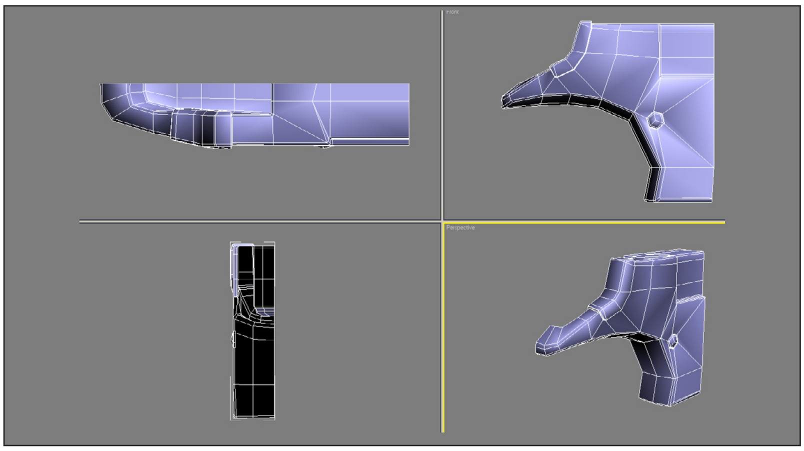


Fig 152



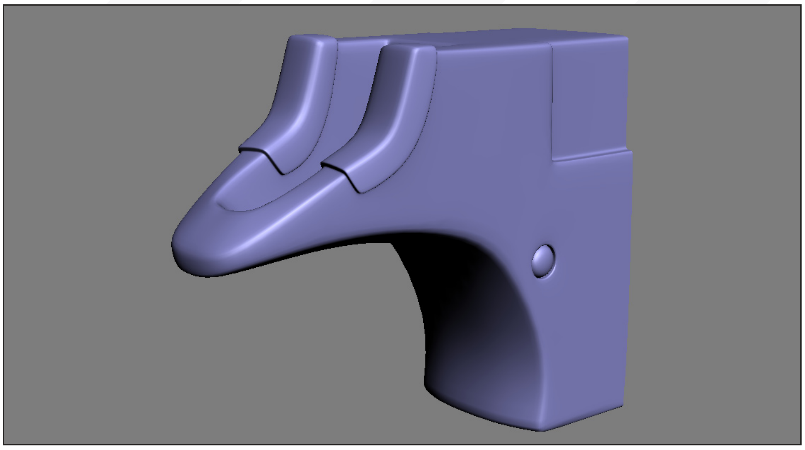


Fig 153

153. Apply the Symmetry and Meshsmooth modifiers. (**Fig.153**)

Fig 154

154. Here is the current stage of the handgun containing all the large pieces. (**Fig.154**)

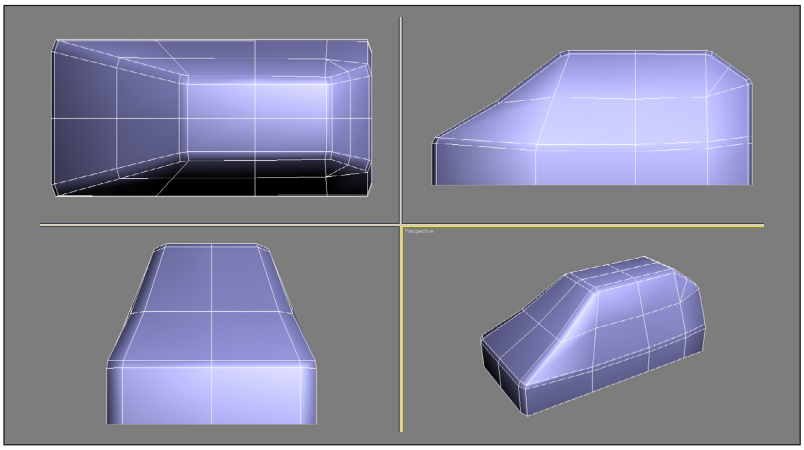


Fig 155

155. Now we are presented with all the small pieces that we are going to add to match the reference.

Here are the sights at the front of the gun. (**Fig.155**)

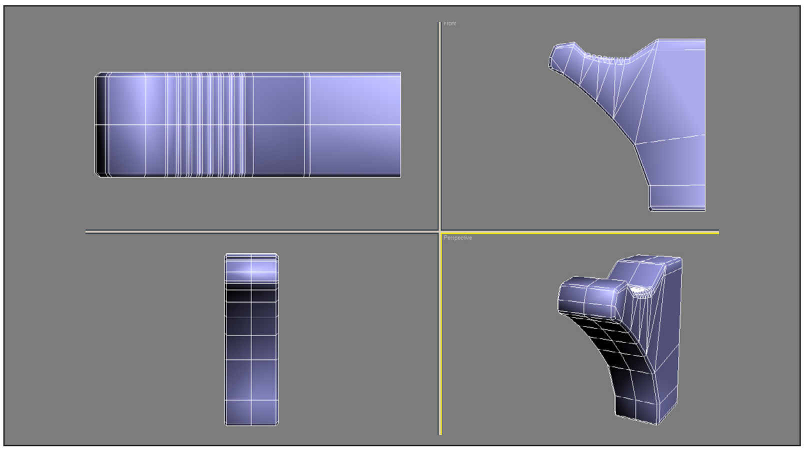
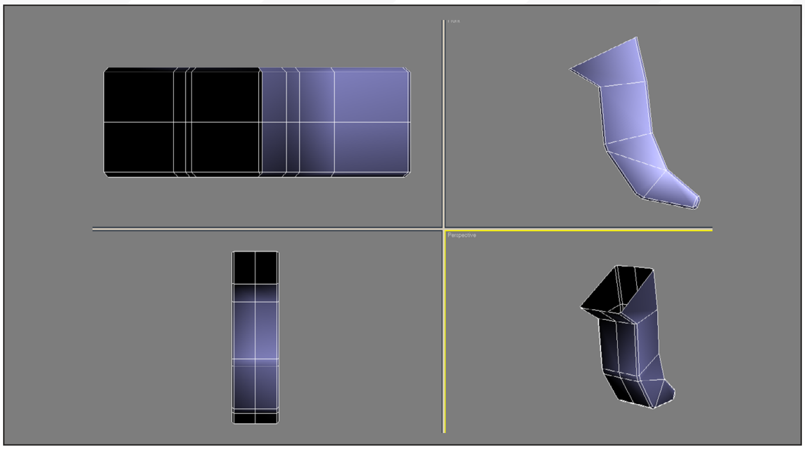


Fig 156

156. The hammer. (**Fig.156**)

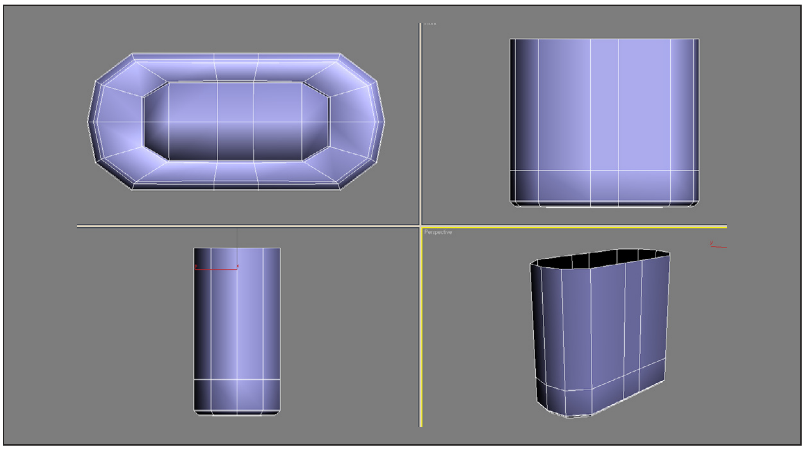
157. The trigger. (**Fig.157**)

Fig 157



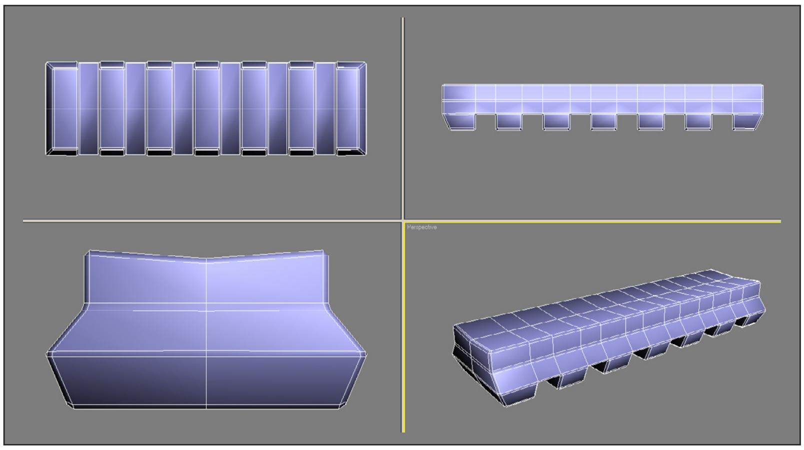
158. The end of the magazine; we don't need to model everything as we don't need this gun to work properly. (**Fig.158**)

Fig 158



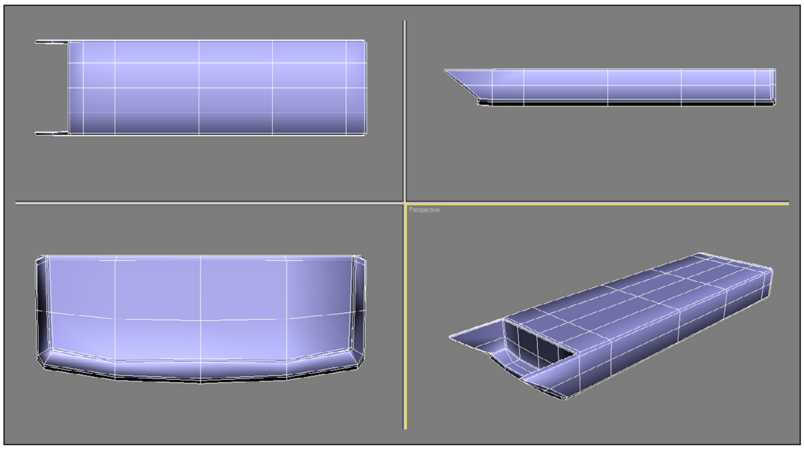
159. Another piece below the barrel of the gun. (**Fig.159**)

Fig 159



160. Another section under the barrel to connect with the one above. (**Fig.160**)

Fig 160



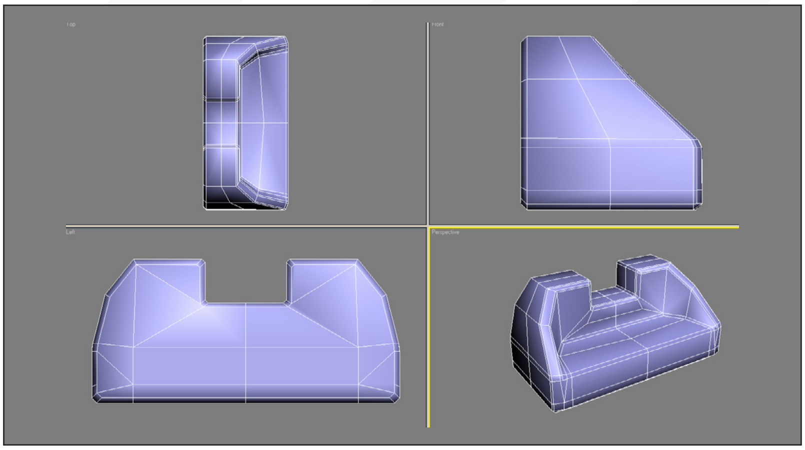


Fig 161

161. The sights at the back of the gun. (**Fig.161**)

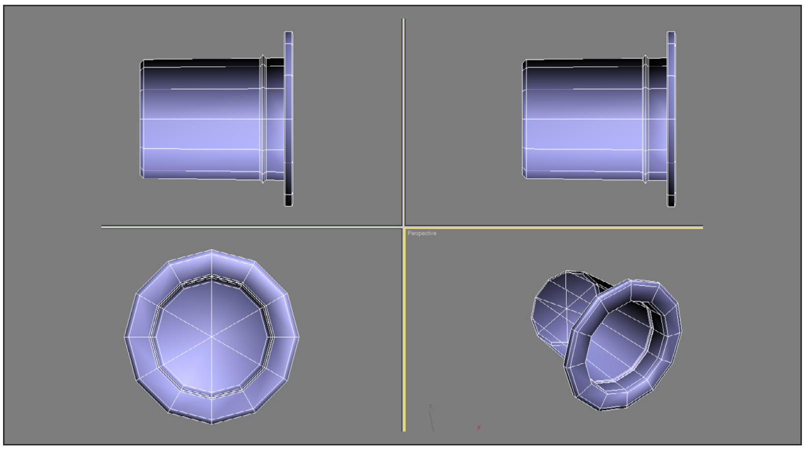


Fig 162

162. The muzzle. (**Fig.162**)

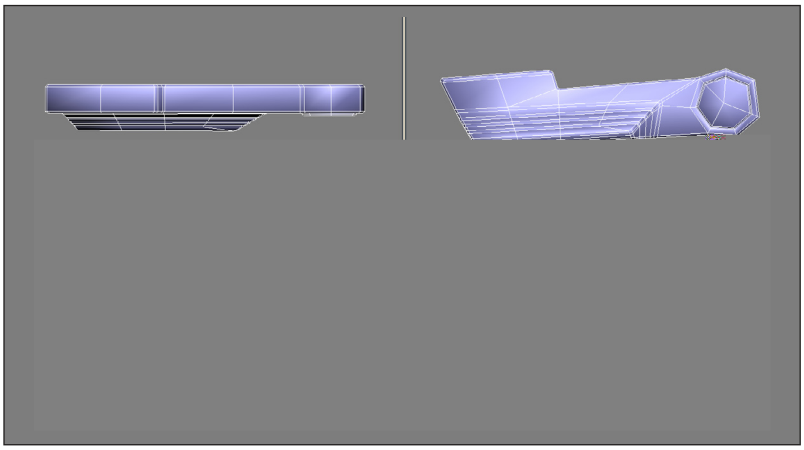


Fig 163

163-164-165- Side details. (**Fig.163 – 165**)

Fig 164

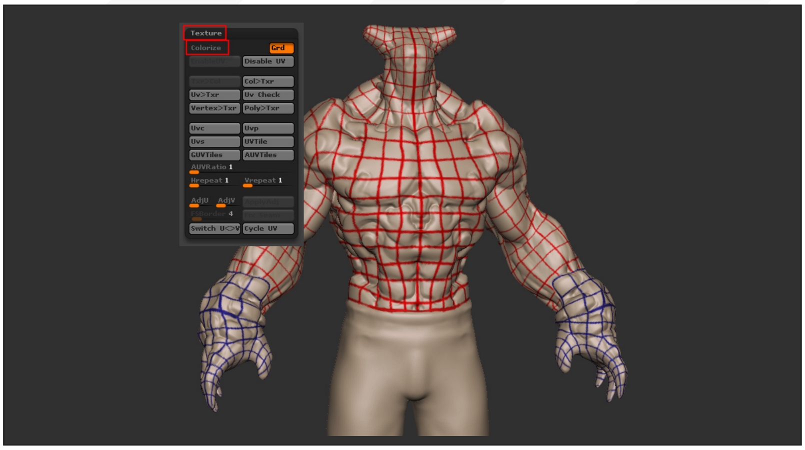


Fig 09

9. Go back to your polypainted Ztool and turn off colorize under the Texture Tab. We are now going to append both previous objects with this tool. (**Fig.09**)

Fig 10

10. Under the SubTool tab, press Append and first choose the Chest and then the Hand as we did in chapter 2 - step22. (**Fig.10**)

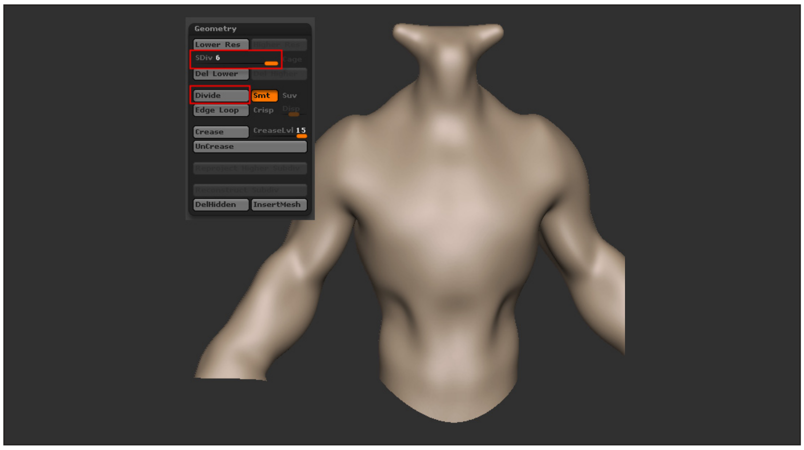


Fig 11

11. We have now three different SubTools; the old concept and the new chest and hand. Select the chest and subdivide it. (**Fig.11**)

Fig 12

12. Now press StoreMT under the Morph Target Tab and display the old concept by pressing on the eye icon beside it. (**Fig.12**)

13. On the left (1) is the last action we did above before pressing ProjectAll in order to project all of the sculpted information from the concept onto the new chest base mesh. (**Fig.13**)

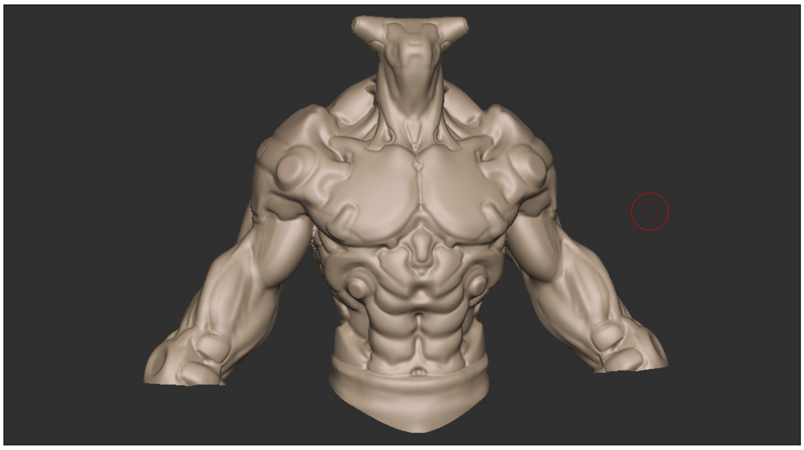
Fig 13

14. Here are the results below. (**Fig.14**)

Fig 14

15. Hide the old concept by pressing the eye icon. We are now going to correct the minor artifacts that the projection has created. (**Fig.15**)

Fig 15



16. Here on the back we can see an example of some small artifacts. (**Fig.16**)

Fig 16

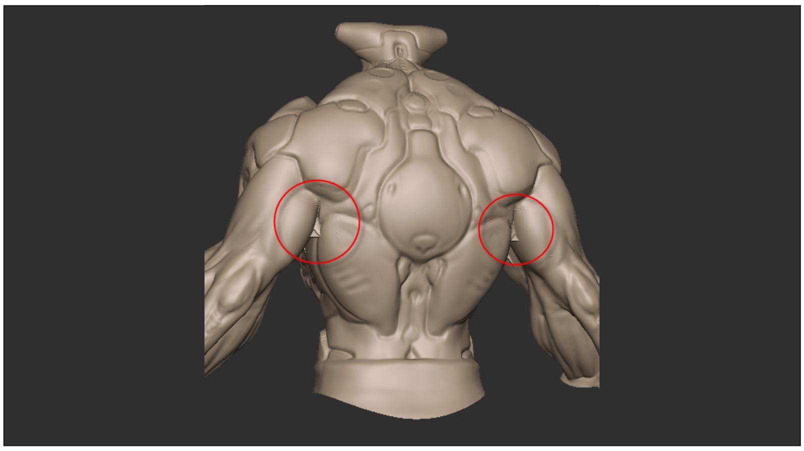


Fig 17

17. Use the Transpose function to select only the arms. (**Fig.17**)

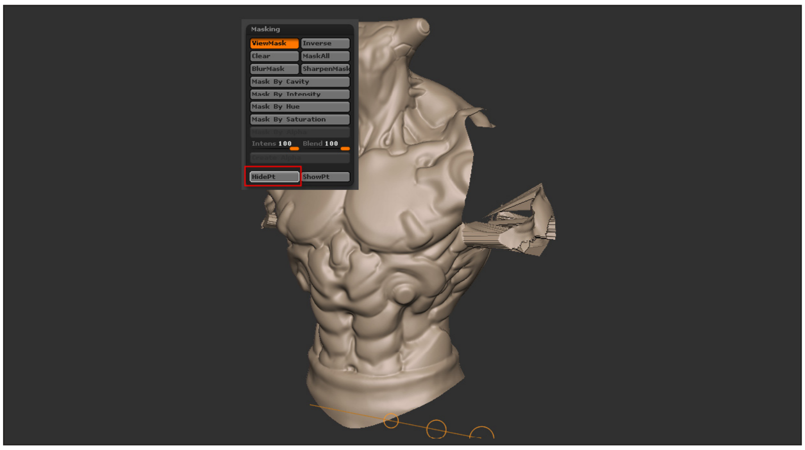


Fig 18

18. Now hide them by pressing HidePt under the Masking Tab. You can now clearly see the artifacts. (**Fig.18**)

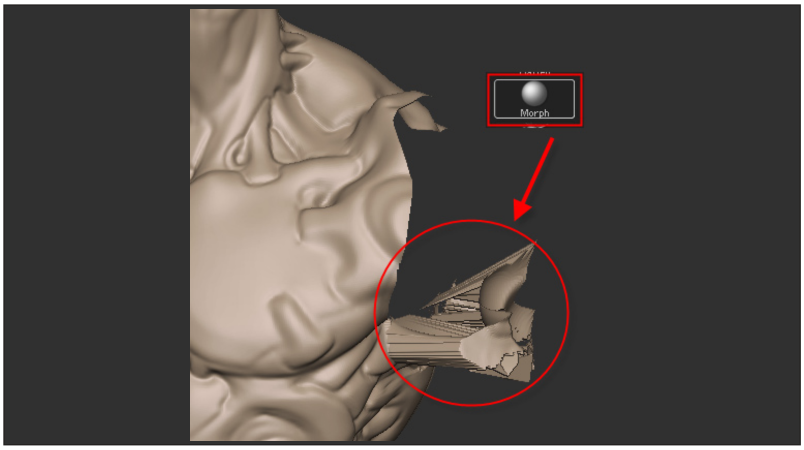


Fig 19

19. We are now going to use the Morph data we stored in step 12 to remove them. Choose the Morph brush and set the intensity to 100. Now all we need to do is just paint on the artifacts. (**Fig.19**)

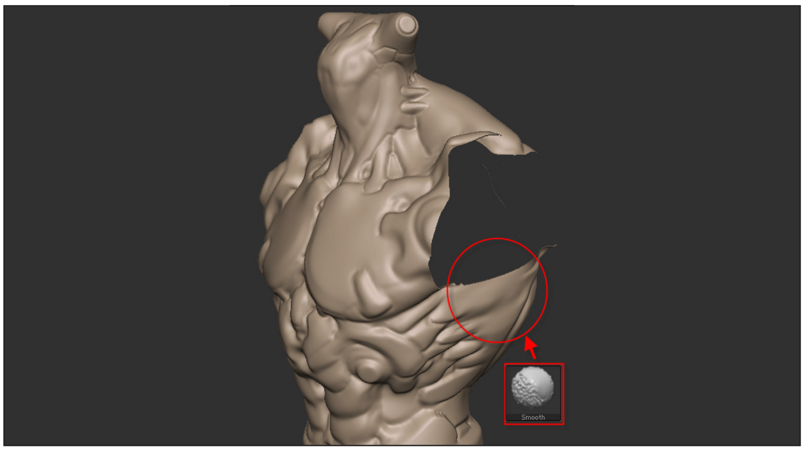
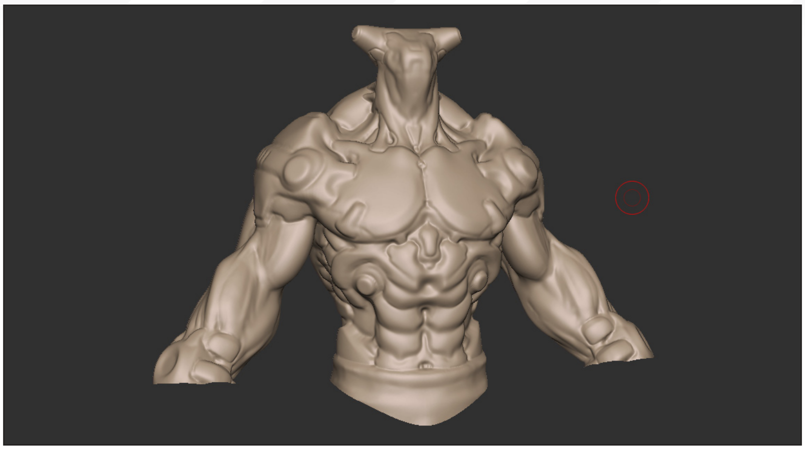


Fig 20

20. Using the Smooth brush, polish the area to get a clean junction. (**Fig.20**)

21. Use the same techniques explained above to fix any other artifacts. Here is an image of the final result. (**Fig.21**)

Fig 21



22. Use the same steps for the hand by first subdividing it and then storing the morph target. (**Fig.22**)

Fig 22

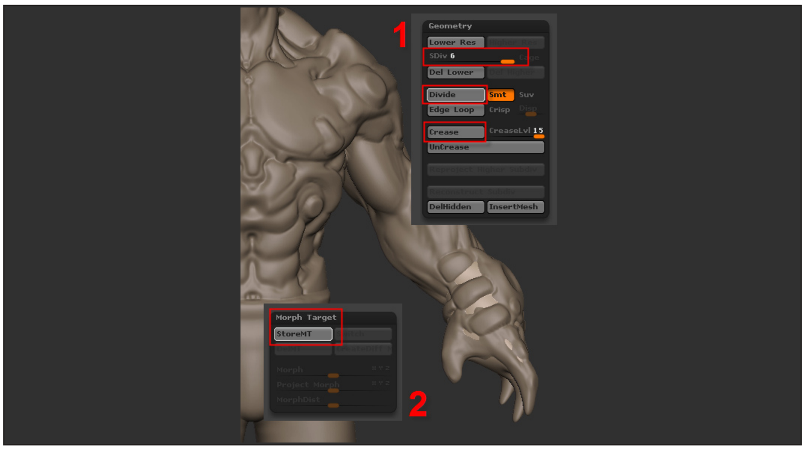
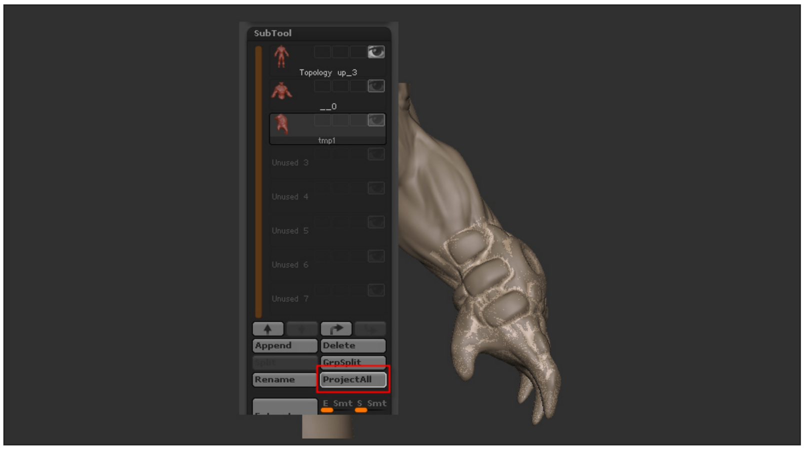


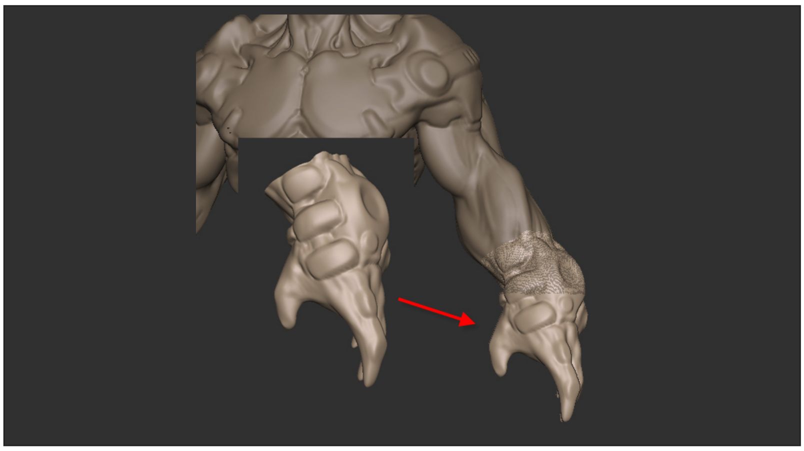
Fig 23



23. Project the old concept onto the new hand. (**Fig.23**)

24. Below you can see both new objects. We are now going to clean the transition between them. (**Fig.24**)

Fig 24



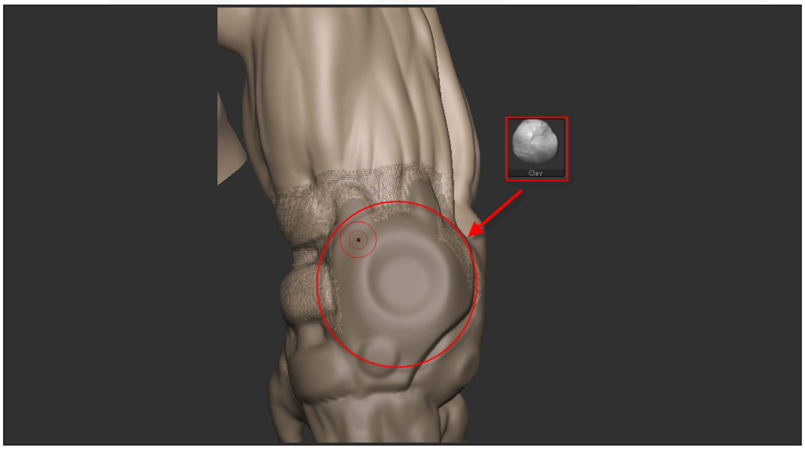


Fig 25

25. Select the chest and using the Clay brush, push in the transition area to get a perfect assembly. (**Fig.25**)

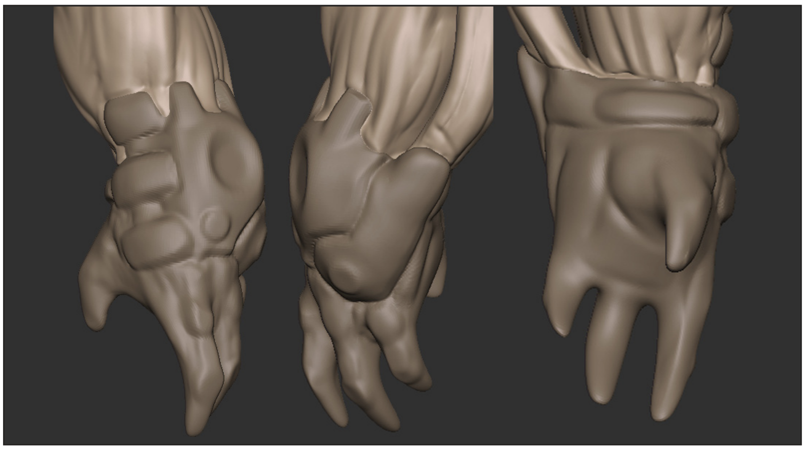


Fig 26

26- 27. Here is a preview from different angles. This doesn't have to be perfect as we are going to polish and sculpt both parts. (**Fig.26 – 27**)

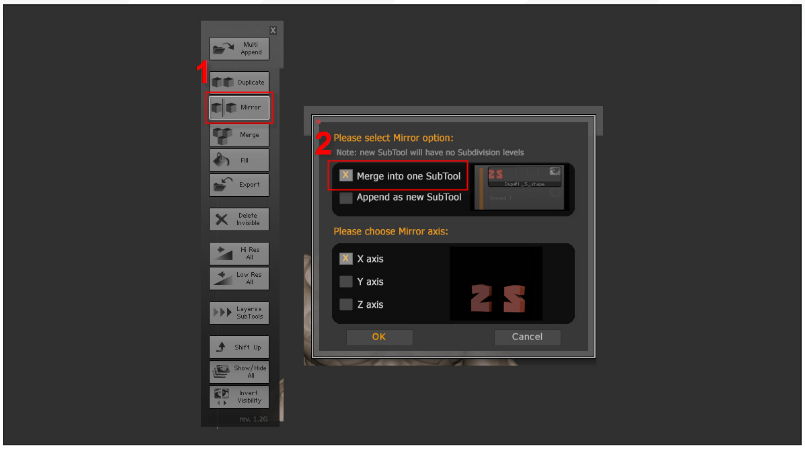
Fig 27

Fig 28

28. We are now going to create a symmetrical copy of the hand. First select the hand and then press Del Lower to remove the objects subdivision history. Then, press the SubTool master button under the Zplugin menu. (**Fig.28**)

29. After a menu appears, click on Mirror and then OK using the parameters shown below. (**Fig.29**)

Fig 29



30- 31. Here are several previews of the result. (**Fig.30 – 31**)

Fig 30

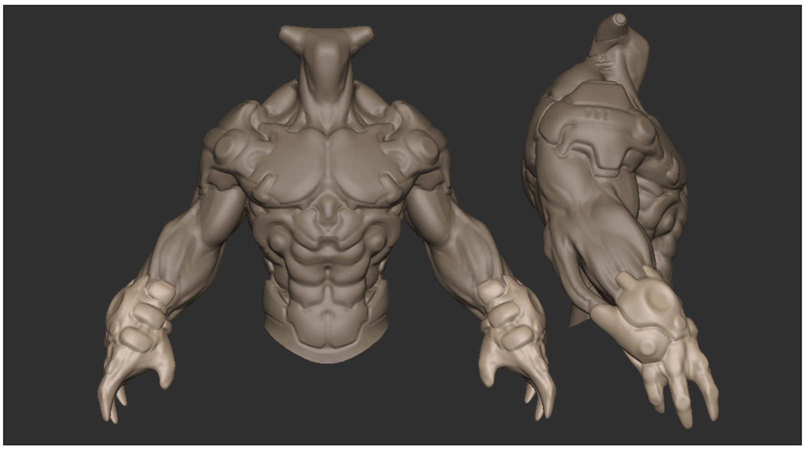
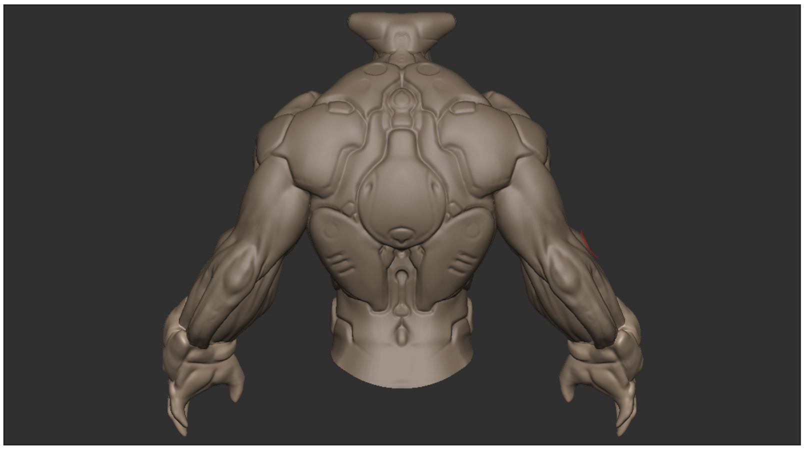


Fig 31



32. Still with the hands selected, reconstruct the subdivision which is proves important in saving display memory. (**Fig.32**)

Fig 32

Fig 33

33. Here is a final preview. (**Fig.33**)

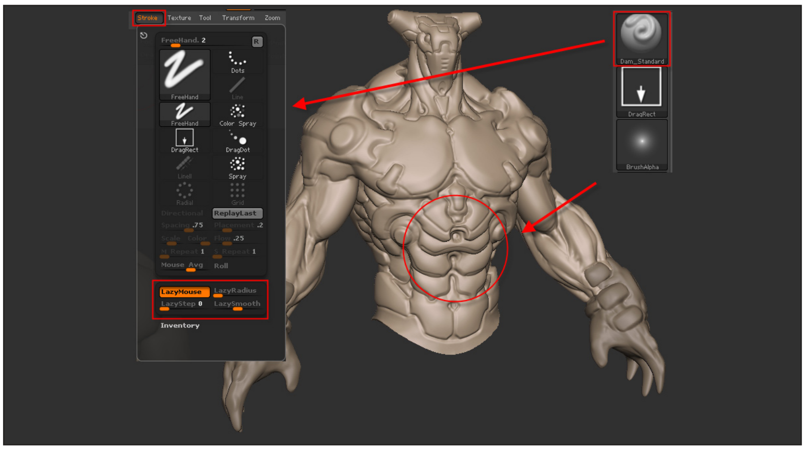


Fig 34

34. Its time now to add more detail to the chest. The Dam standard brush is the main key to achieve this and when used with the LazyMouse it becomes the most powerful tool ever. After selecting the Dam Standard brush, press L to activate the LazyMouse and change the stroke parameters to those shown below in order to draw some perfect smooth lines. Let's now draw some more details on the front. (**Fig.34**)

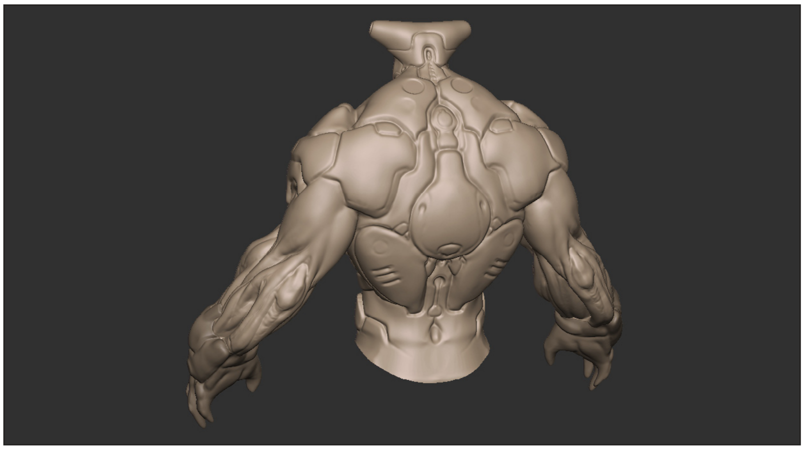


Fig 35

35. The back. (**Fig.35**)

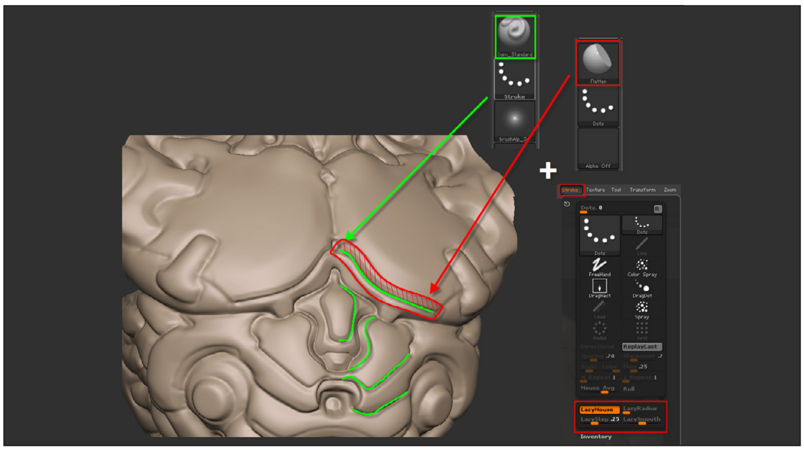
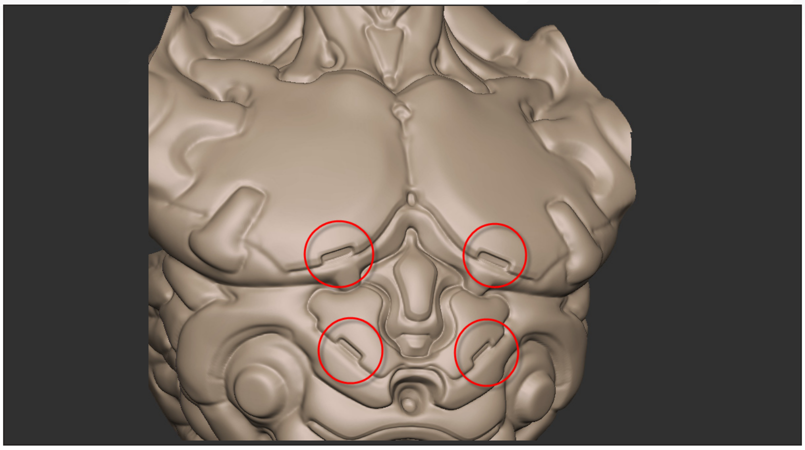


Fig 36

36. We are now going to work on a small area to explain the different steps in the process and then apply these techniques to the entire character. Using the Dam Standard brush draw the lines slowly to avoid artifacts, and then use the Flatten brush with the same LazyMouse/ stroke parameters to flatten the corresponding line above the previous one. All the green lines are done with Dam Standard brush but don't hesitate to use Smooth sometimes to remove bumpy effects. (**Fig.36**)

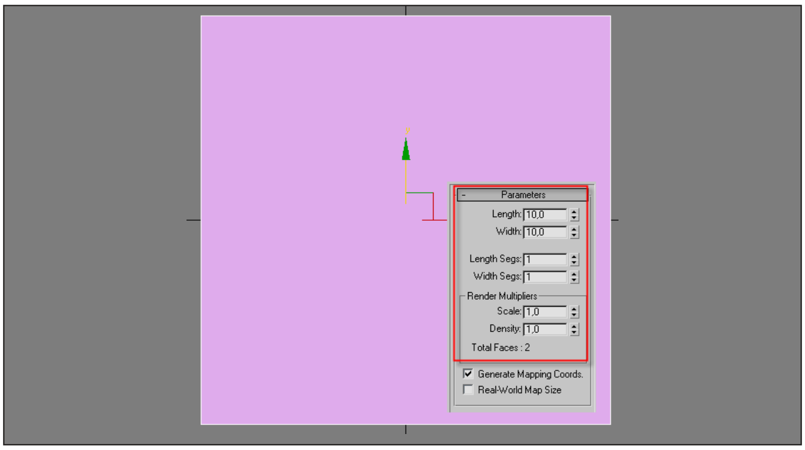
37. We are now going to explain how to create and sculpt these details. This technique is probably the second main component in the mechanical sculpting process. In reality, these details begin as actual 3D objects so let's create them in 3ds max first. (**Fig.37**)

Fig 37



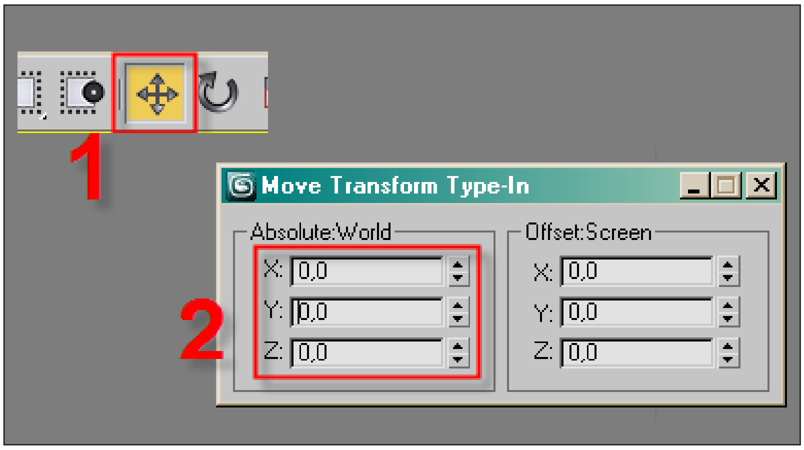
38. Create a basic plane in 3dsmax using the parameters shown below. We will first create a rectangle. (**Fig.38**)

Fig 38



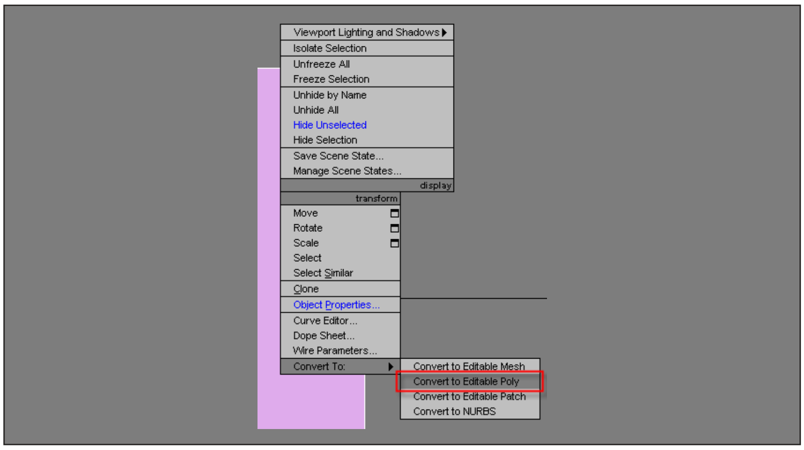
39. Move it to the center of the scene and then right click on the Move button to display the pop up box below and change the X, Y and Z values. (**Fig.39**

Fig 39



40. Convert it into an Editable Poly. (**Fig.40**)

Fig 40



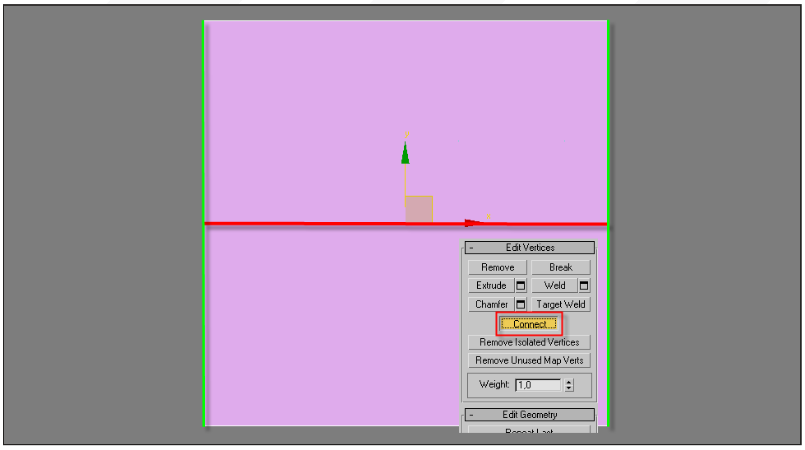


Fig 41

41. Select the edges shown in green and press the Connect button to create a new edge. (**Fig.41**)

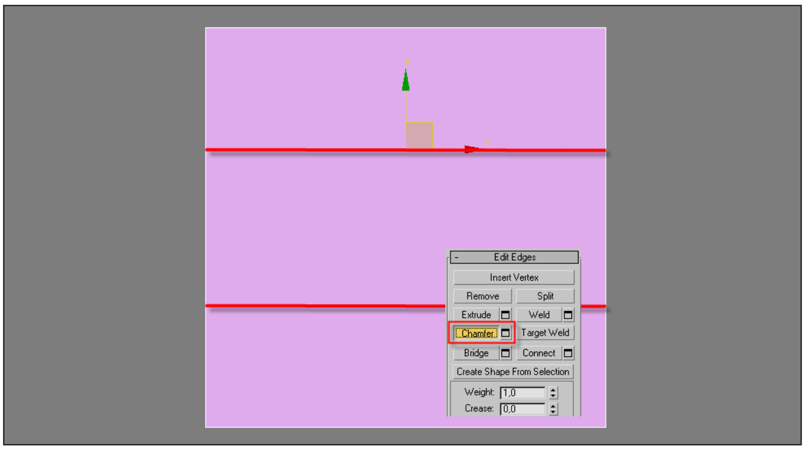


Fig 42

42. Select the newly created edge and chamfer it as shown below. (**Fig.42**)

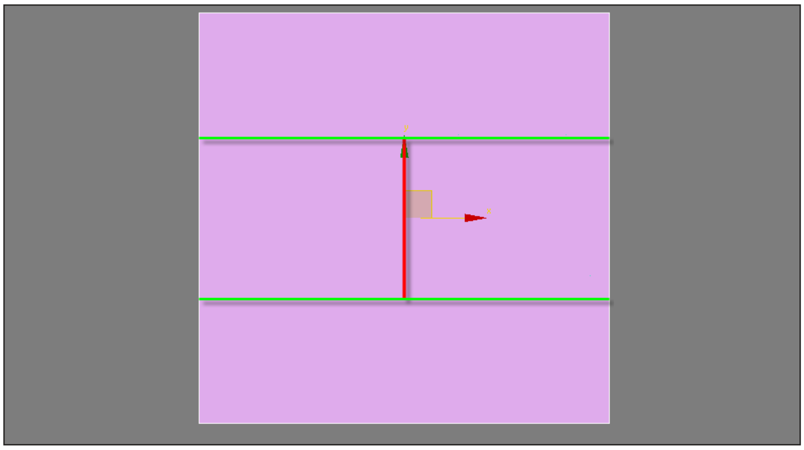


Fig 43

43. Repeat the process to create a new edge between them. (**Fig.43**)

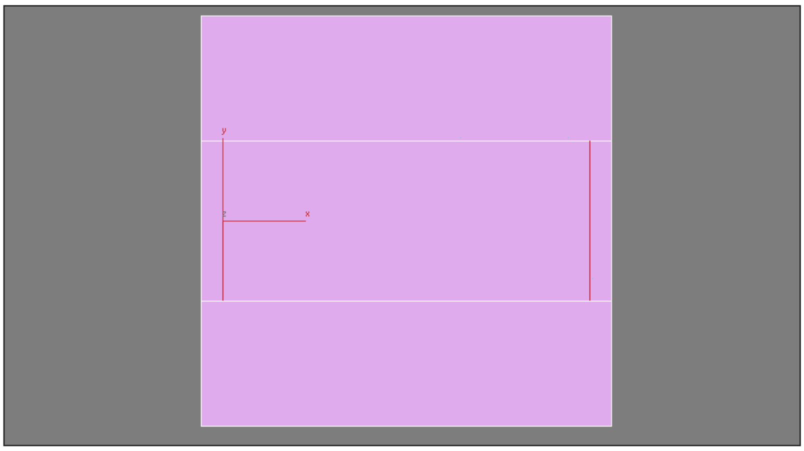
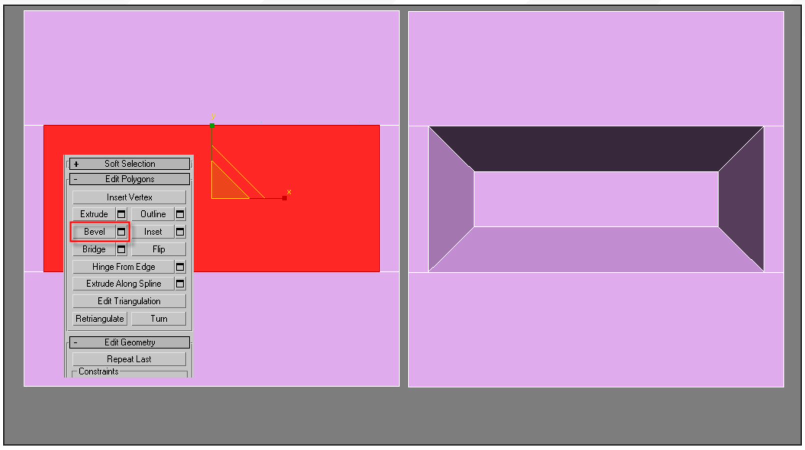


Fig 44

44. Chamfer it once again to get the result shown below. (**Fig.44**)

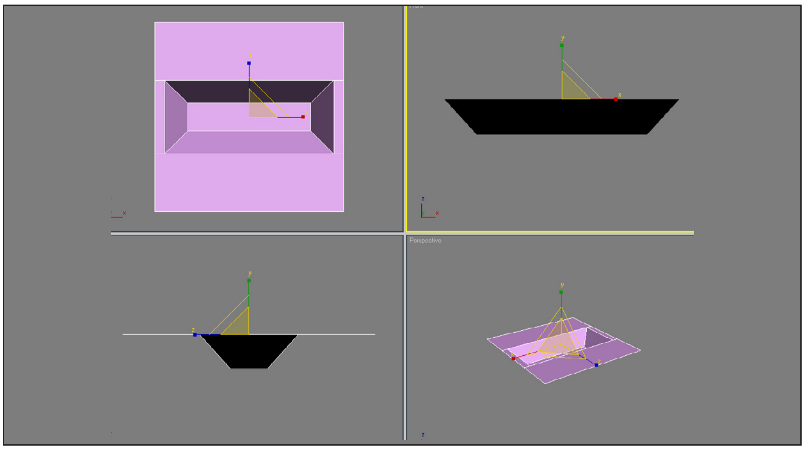
45. Select the face and Bevel it as shown on the right. (**Fig.45**)

Fig 45



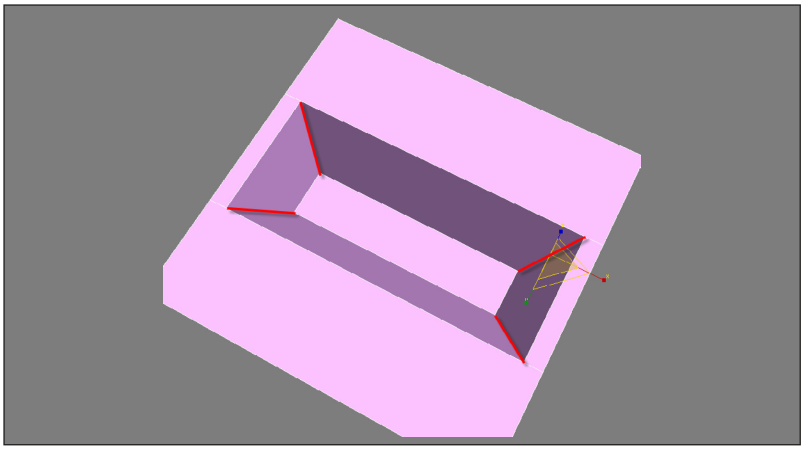
46. Here is a preview of the current stage. (**Fig.46**)

Fig 46



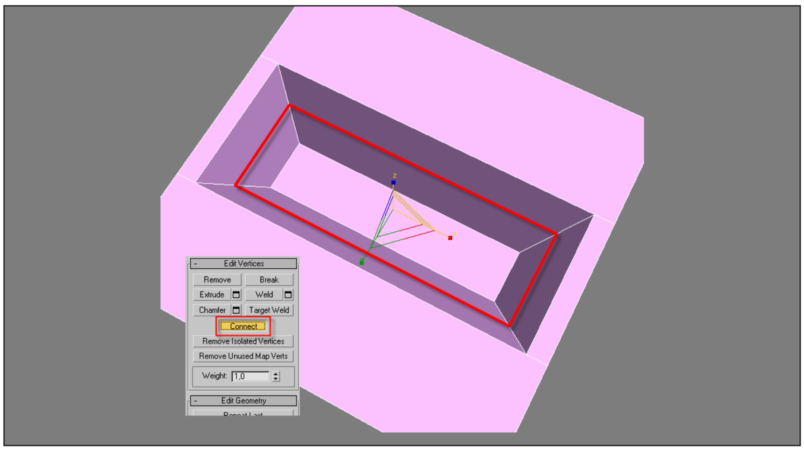
47. Select the edges as shown below. (**Fig.47**)

Fig 47



48. Now press Connect to create a new Edge Loop. (**Fig.48**)

Fig 48



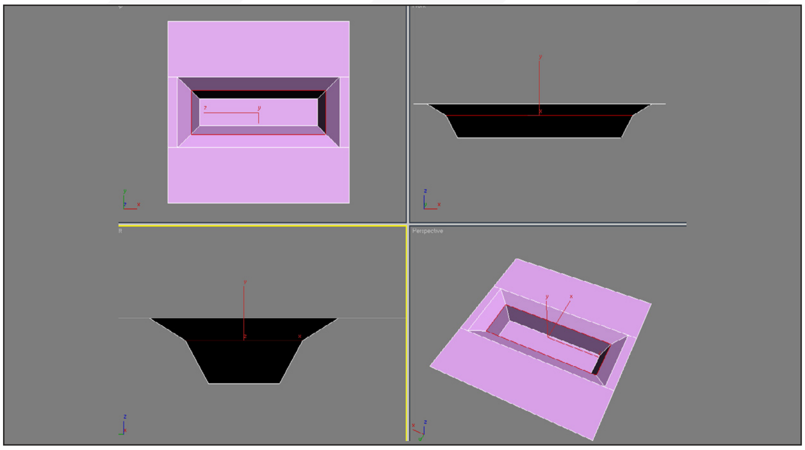


Fig 49

49. Move and scale the newly created Edge Loop as shown below. (**Fig.49**)

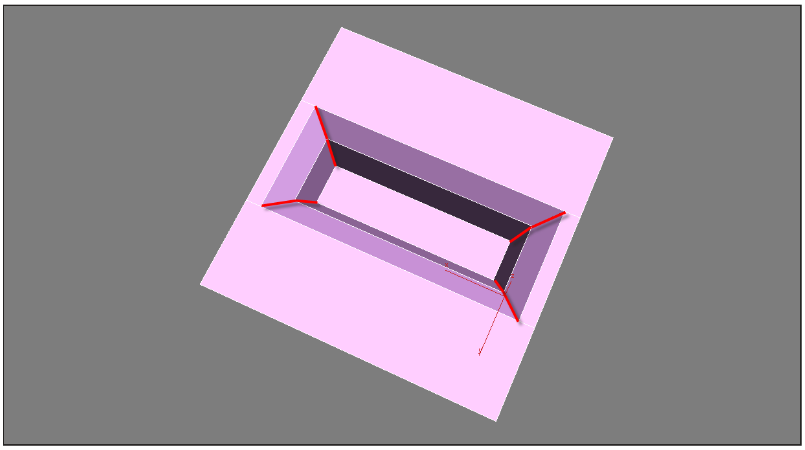


Fig 50

50. Select the corner edges. (**Fig.50**)

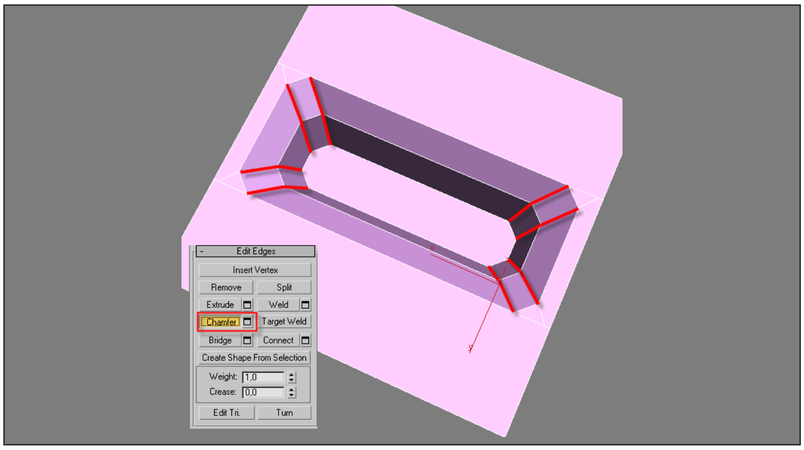


Fig 51

51. Now chamfer them which will sharpen the corners. (**Fig.51**)

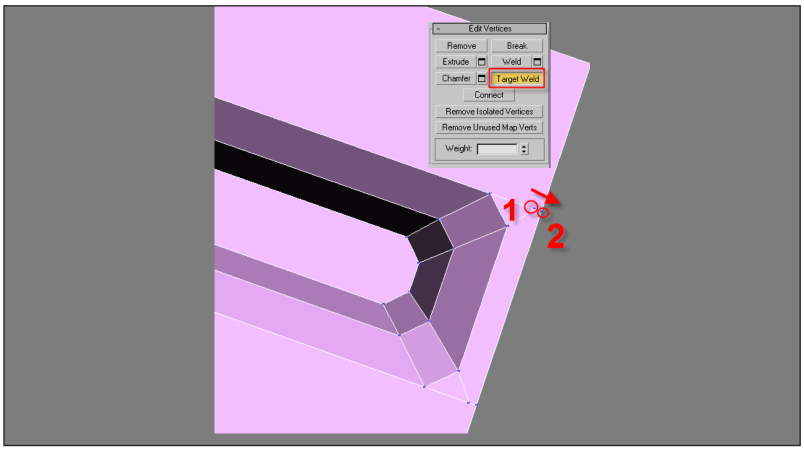
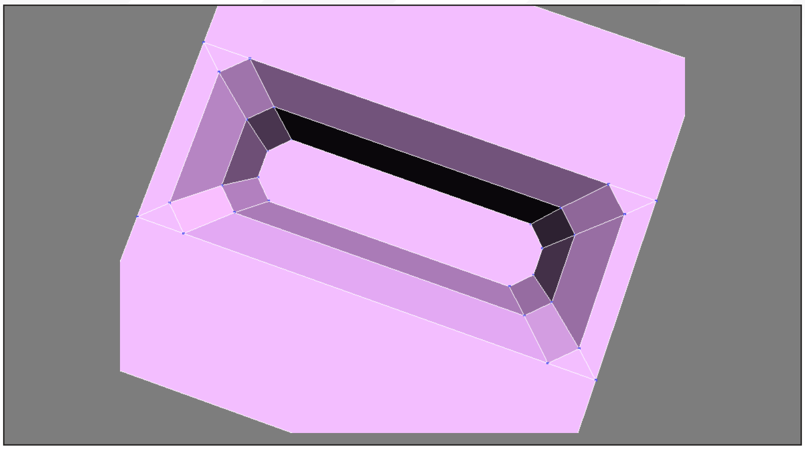


Fig 52

52. We will now clean up the object. Press Target Weld and then select vertex one followed by vertex two to weld them together. (**Fig.52**)

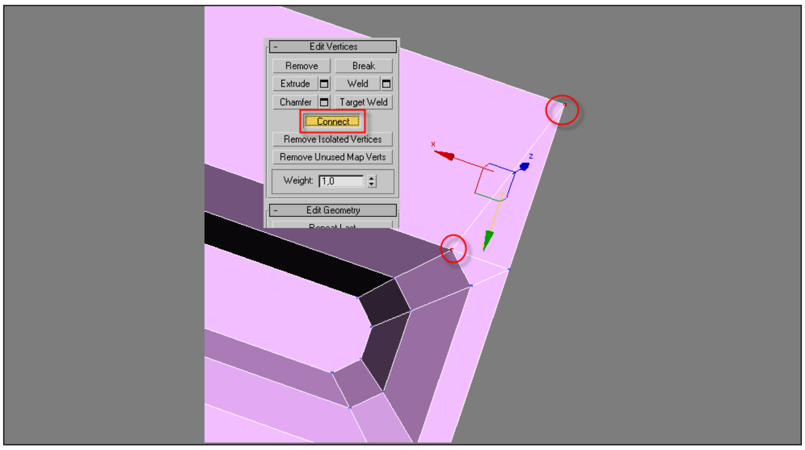
53. Follow the same procedure with each corner, the result of which can be seen below. (**Fig.53**)

Fig 53



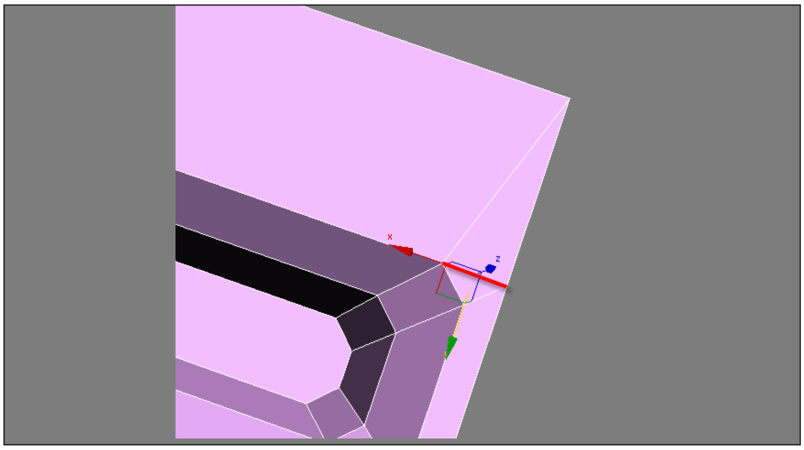
54. To maintain the object as quads, Connect the vertices shown below. (**Fig.54**)

Fig 54



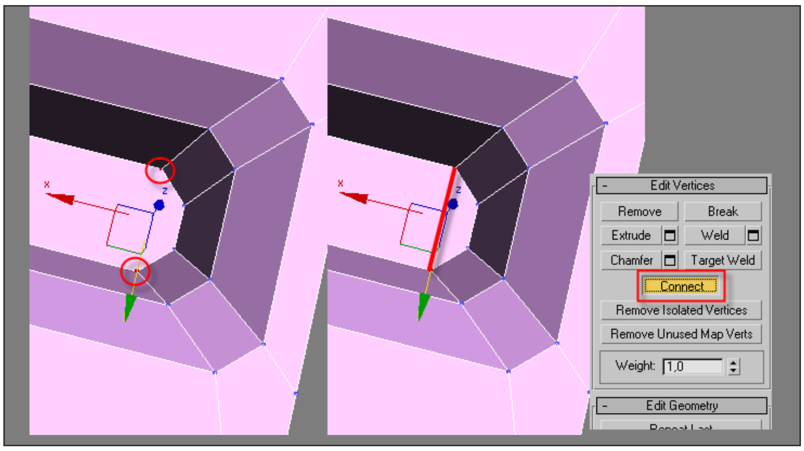
55. Now delete the edge in the middle to create a quad. (**Fig.55**)

Fig 55



56. Do the same inside the shape to generate quads. (**Fig.56**)

Fig 56



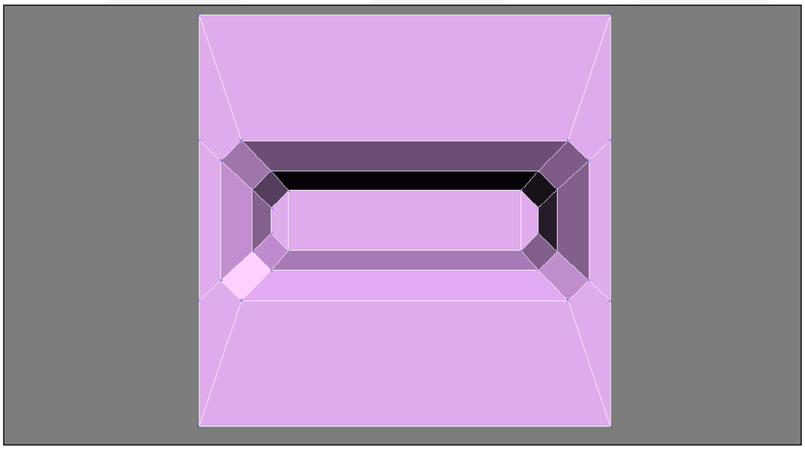


Fig 57

57. Here is a preview of the final result. (**Fig.57**)

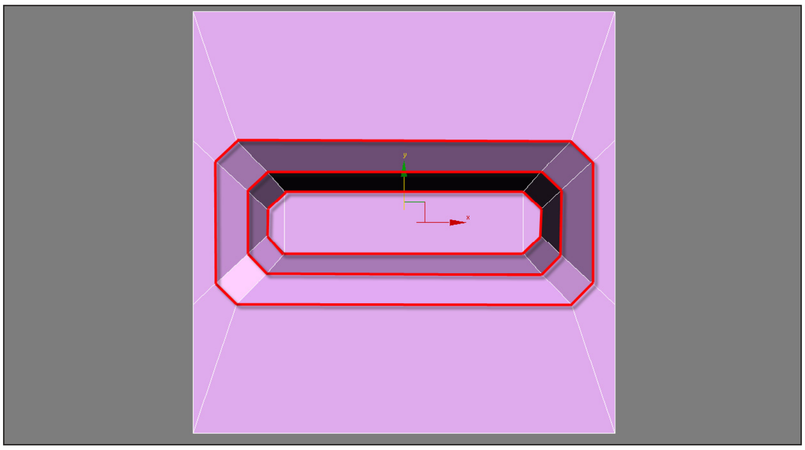


Fig 58

58. Now select all the edges shown below. (**Fig.58**)

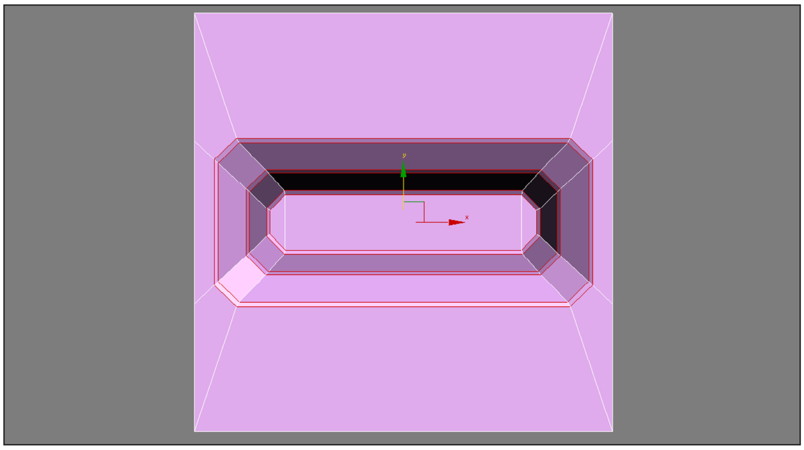


Fig 59

59. Apply a Chamfer as shown below. (**Fig.59**)

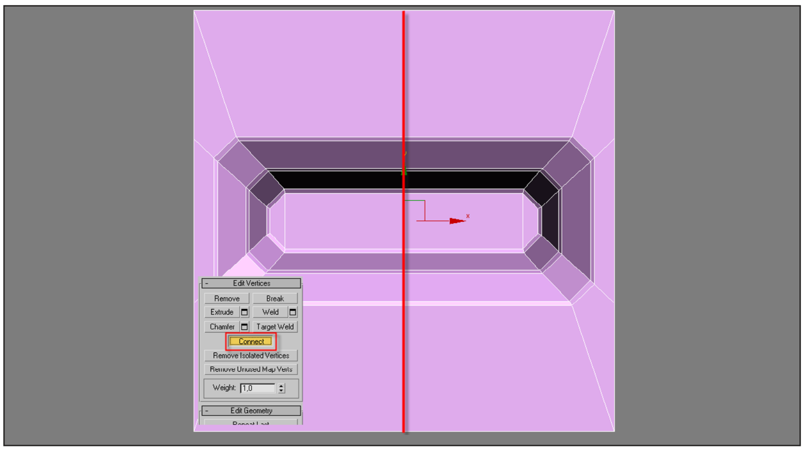
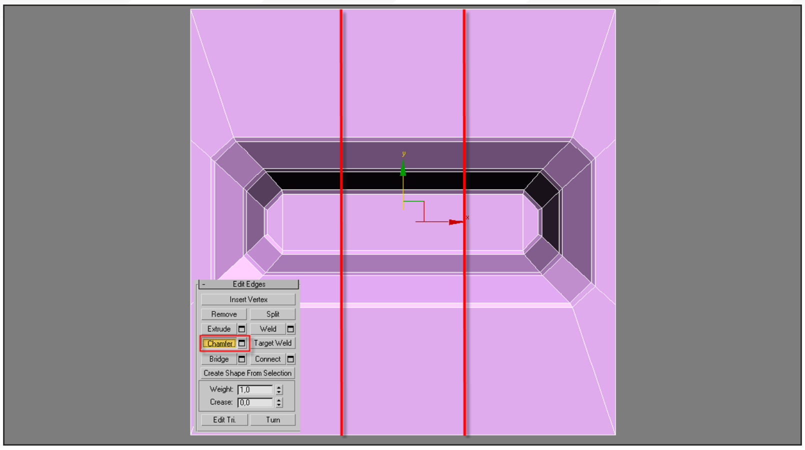


Fig 60

60. Select all the horizontal edges and press Connect to create a new Ring Loop. (**Fig.60**)

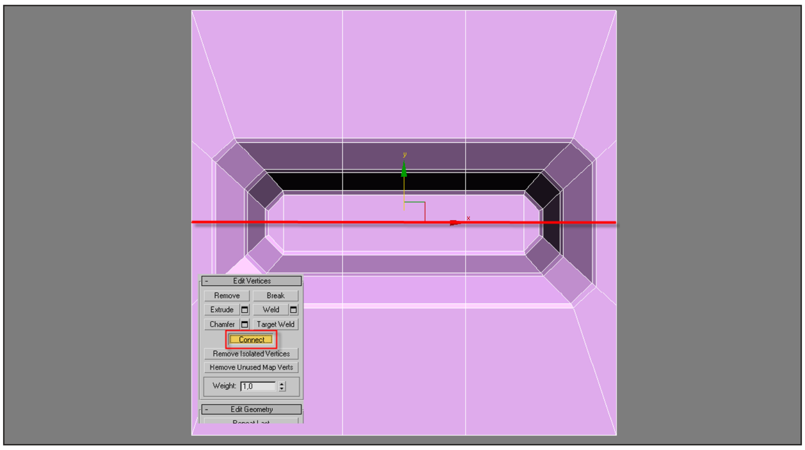
61. Now Chamfer the newly created edges. (**Fig.61**)

Fig 61



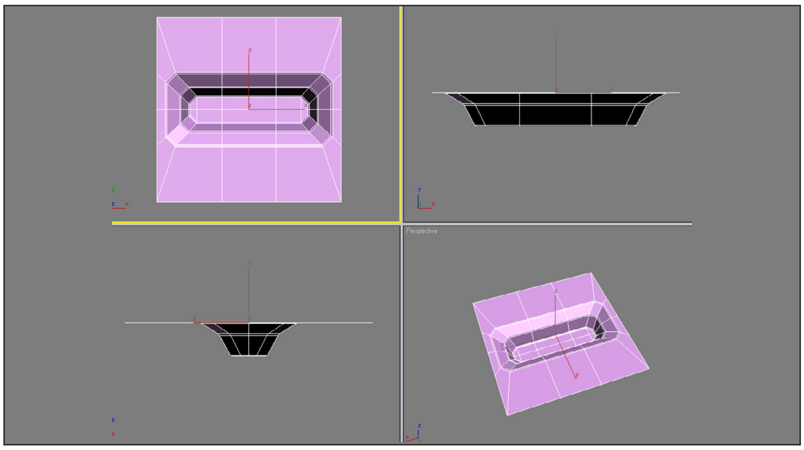
62. Follow the same procedure for the vertical edges. (**Fig.62**)

Fig 62



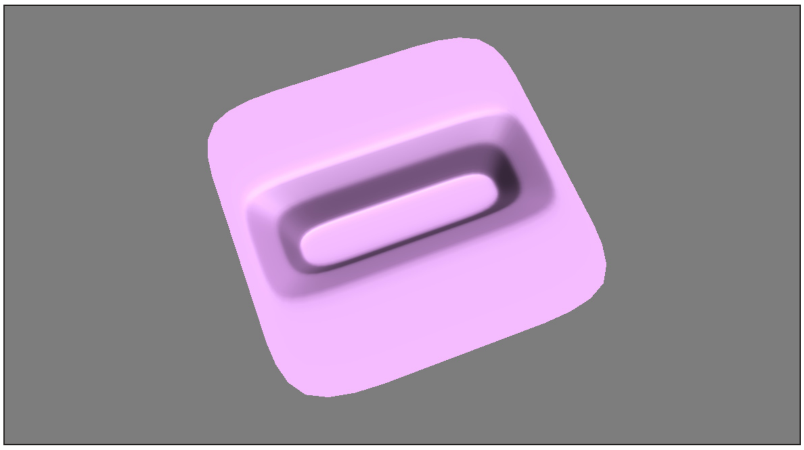
63. Here is a preview of the final object. (**Fig.63**)

Fig 63



64. Here is newly smoothed preview. (**Fig.64**)

Fig 64



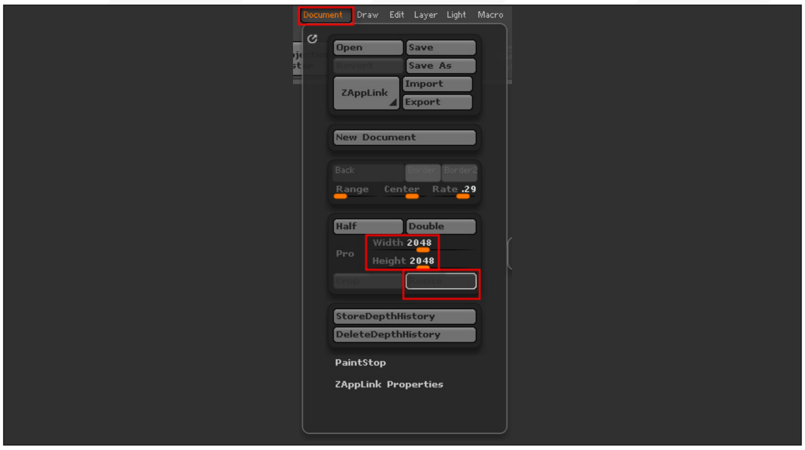


Fig 65

65. We are now going to create an alpha from this object. Go back into Zbrush and change the document parameters as it's important to get the maximum quality. (**Fig.65**)

Fig 66

66. Use the zoom button on the right to see the entire Canvas in the screen as it's important to use the entire space. (**Fig.66**)

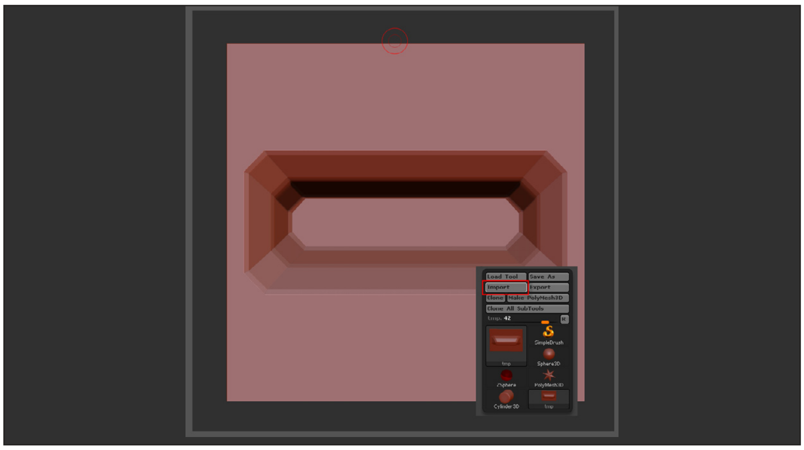


Fig 67

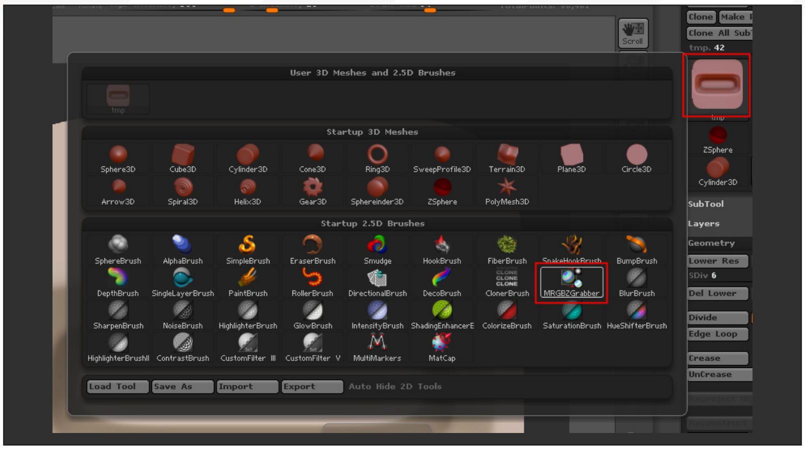
67. Import the object created in 3dsmax. (**Fig.67**)

Fig 68

68. Press Crease to limit the shrink effect at the extremity and subdivide it until it's perfectly smoothed. Then Under the Display Property tab press Flip to invert your object. (**Fig.68**)

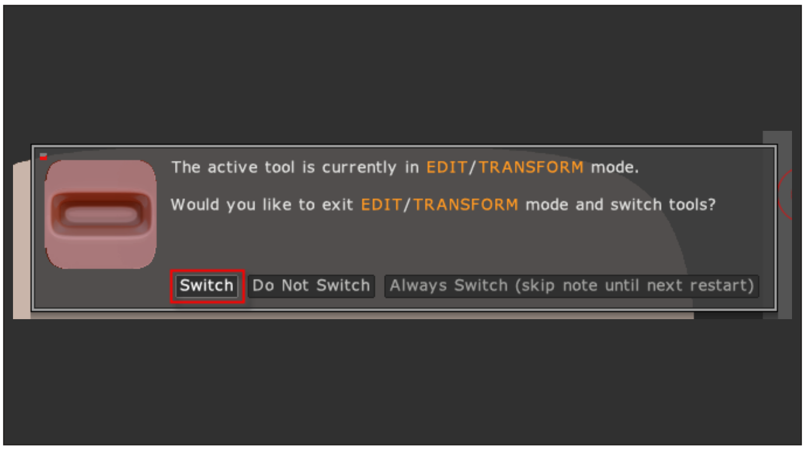
69. Choose MRGBZGrabber in the list shown below. This function will allow us to grab the depth of the object. (**Fig.69**)

Fig 69



70. Click on Switch when you see the following warning. (**Fig.70**)

Fig 70



71. It's now time to create the white square. Turn off Auto Crop and draw the square at its maximum size using the entire canvas. (**Fig.71**)

Fig 71

72. When you release the mouse, the data is sent to the alpha position. You have now your alpha. (**Fig.72**)

Fig 72

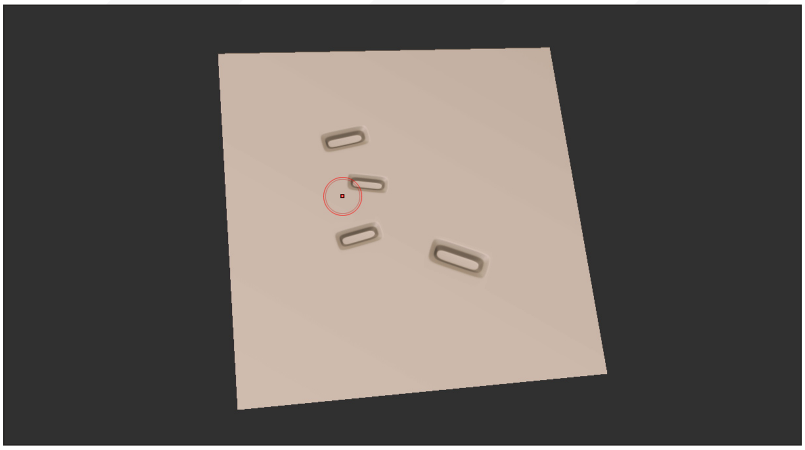


Fig 73

73. Here is a quick test which will be explained in the following paragraphs. (**Fig.73**)

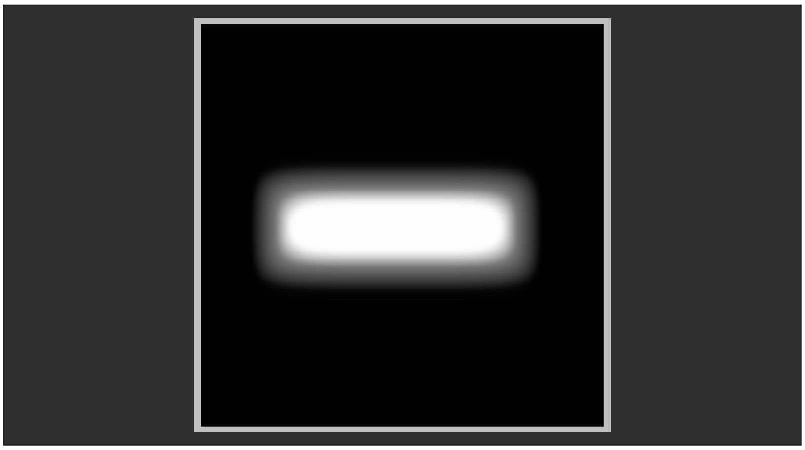


Fig 74

74. It's good to keep the original alpha (2048*2048) but thanks to Photoshop we can reduce it to 512*512 and save another iteration that we will use on the model. (**Fig.74**)

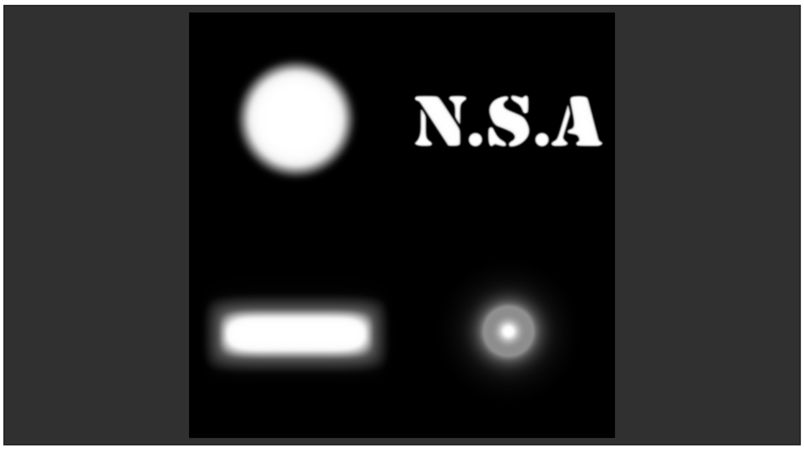


Fig 75

75. Here are the different alphas I used for the chest. I used the exact same method to create them as explained above. (**Fig.75**)

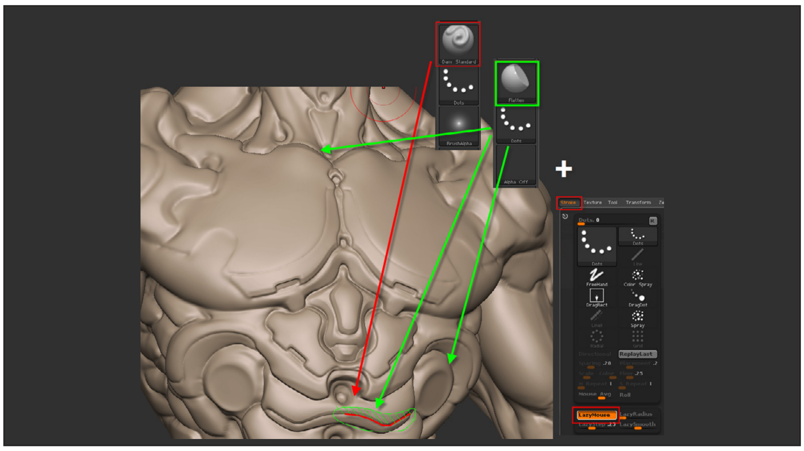
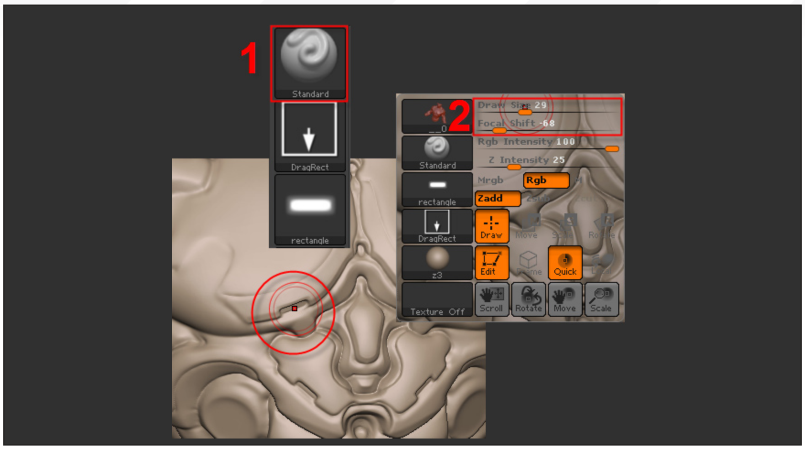


Fig 76

76. Going back to the chest it's now time now to polish it a bit more in the different areas. Still using the Dam Standard and Flatten brushes, we can slowly clean the shape. (**Fig.76**)

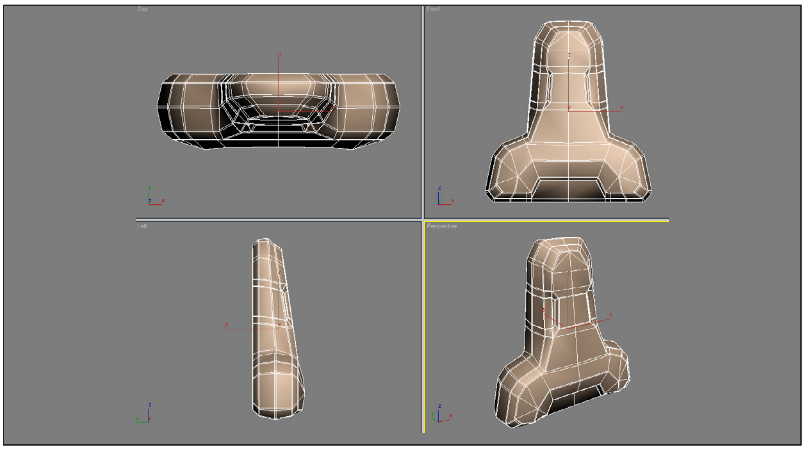
77. To apply the rectangles to your shape, use the standard brush with the DragRect stroke and select the rectangle alpha. Now right click on the model to change the brush parameters, bearing in mind that the Draw Size and Focal Shift have to be close. This procedure is important if you want to create a clean rectangle. You can now place them on your object. (**Fig.77**)

Fig 77



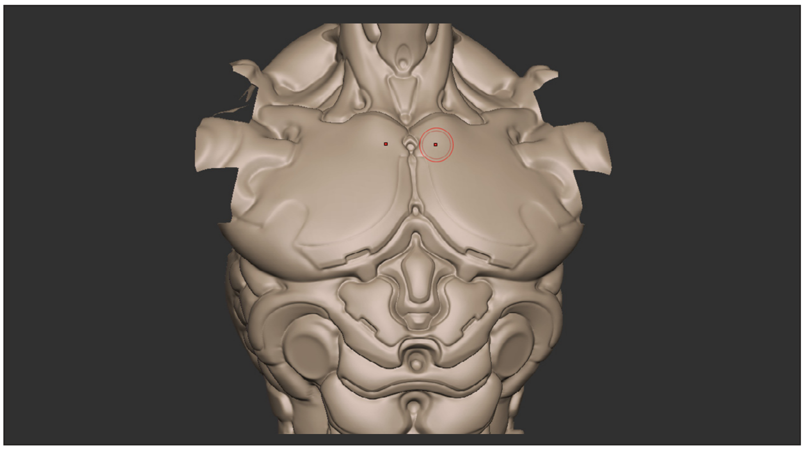
78. Let's create another object in 3ds Max that we will put on the chest. (**Fig.78**)

Fig 78



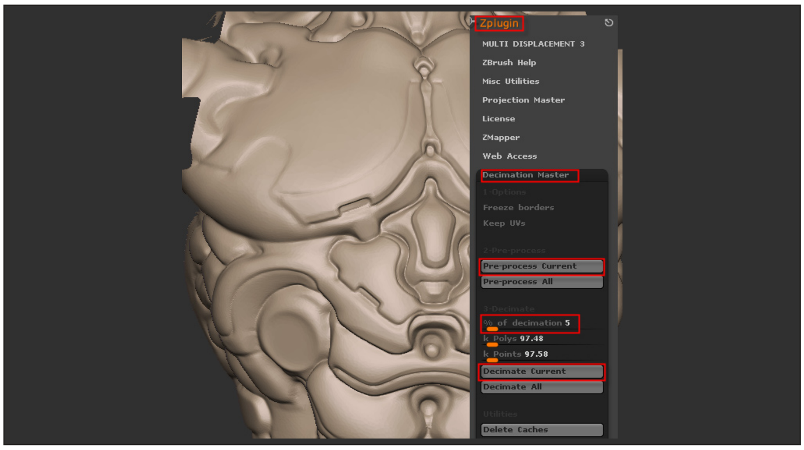
79. Go back into Zbrush with your chest. (**Fig.79**)

Fig 79



80. We are now going to decimate the chest in order to bring it into 3ds Max and avoid any memory crash. (**Fig.80**)

Fig 80



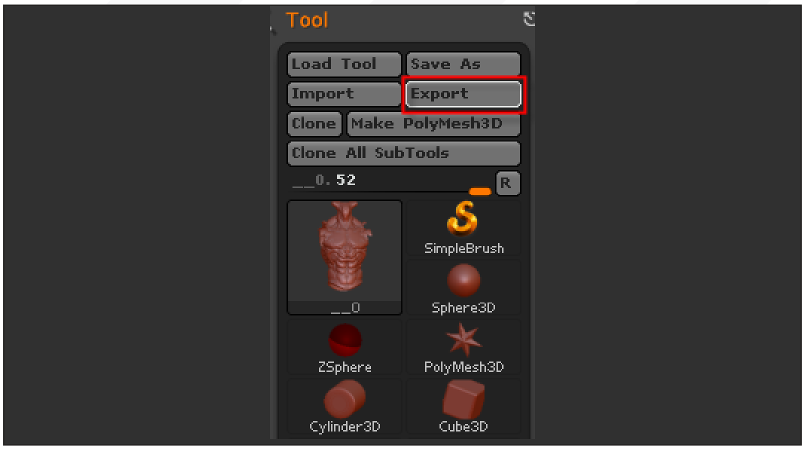


Fig 81

81. Once its done export the optimized chest. (**Fig.81**)

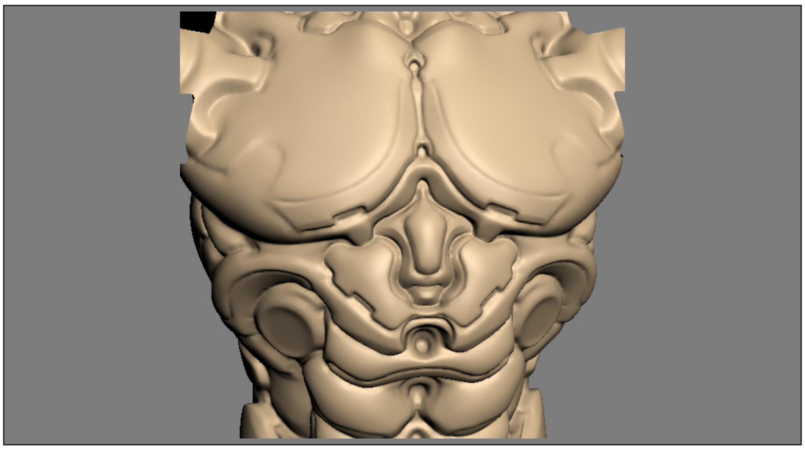


Fig 82

82. Import it in into Max. (**Fig.82**)

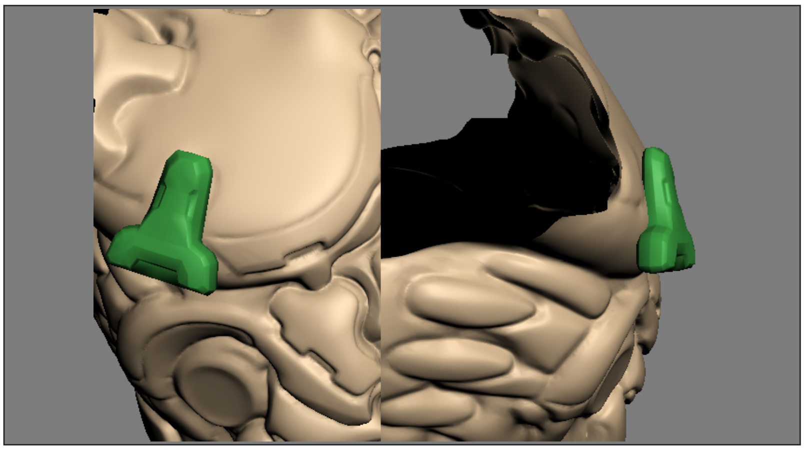


Fig 83

83. Merge the newly created object and position it to mimic what we see below. Don't move vertices as we will match both objects in Zbrush. Export the green object as an obj. (**Fig.83**)

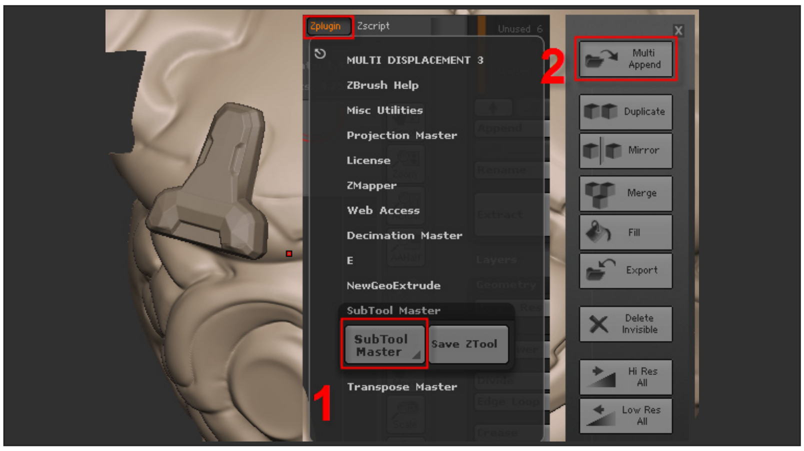
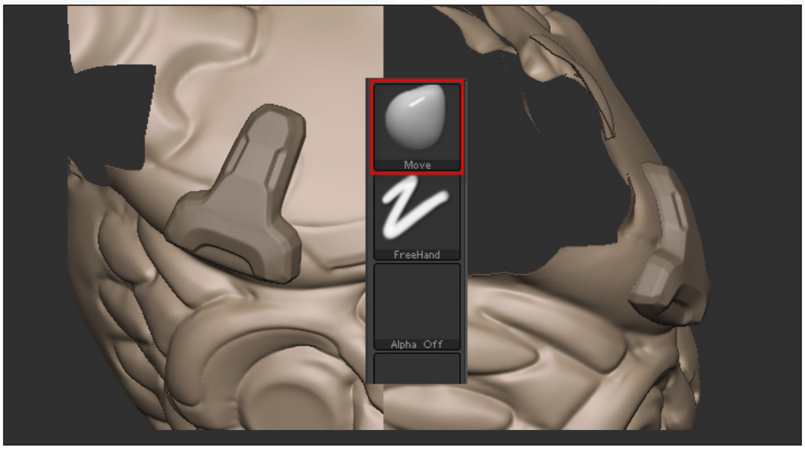


Fig 84

84. Open up Zbrush and import the object into the scene by way of SubTool Master. (**Fig.84**)

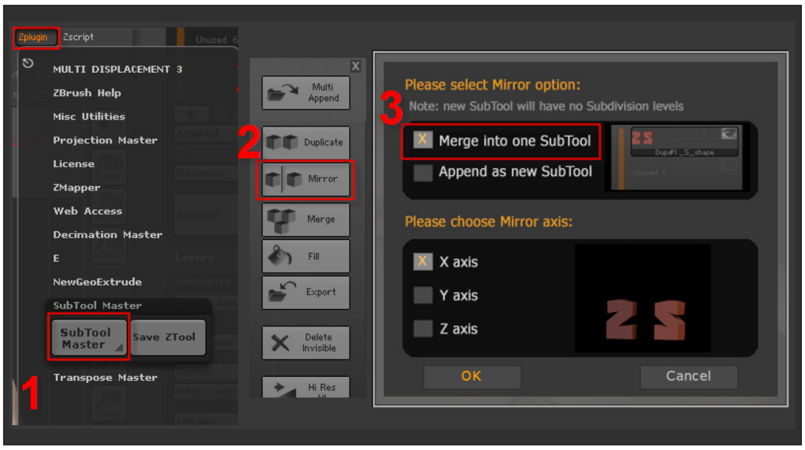
85. Use the Move brush to push the new object a little in order to match it perfectly with the chest. (**Fig.85**)

Fig 85



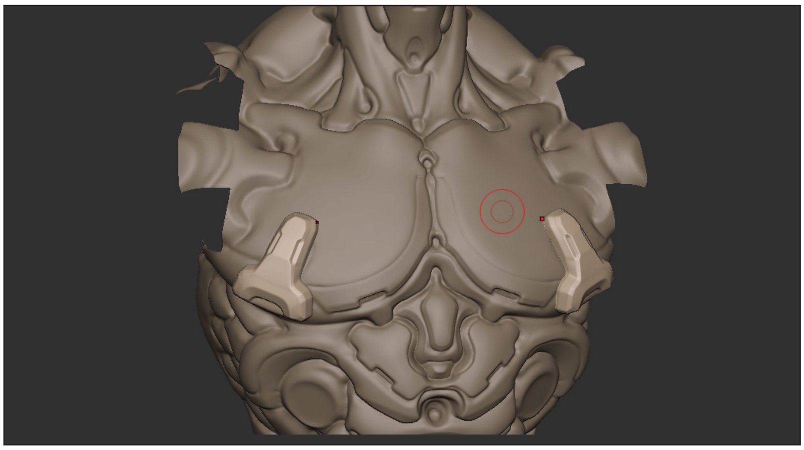
86. Once again, use the SubTool Master to mirror the newly created object. (**Fig.86**)

Fig 86



87. Here is the final result. (**Fig.87**)

Fig 87



88. Use the same technique as explained in step 77 to create these holes. The alpha in the bottom left was used (see 75). (**Fig.88**)

Fig 88

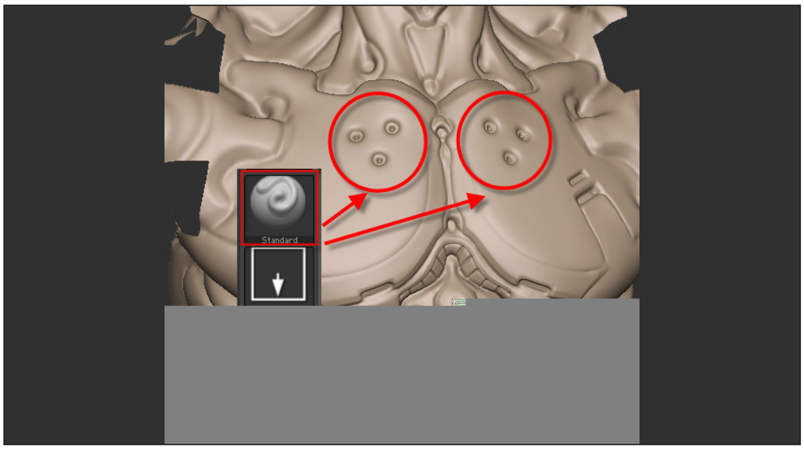


Fig 117

118-119-120. I also added a simple military pouch to create some extra detail. Here are the different sculpting steps. (**Fig.118 – 120**)

Fig 118

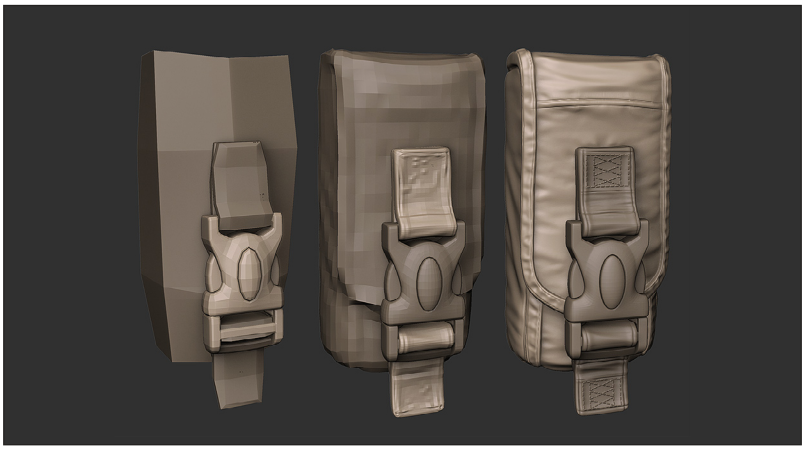


Fig 119

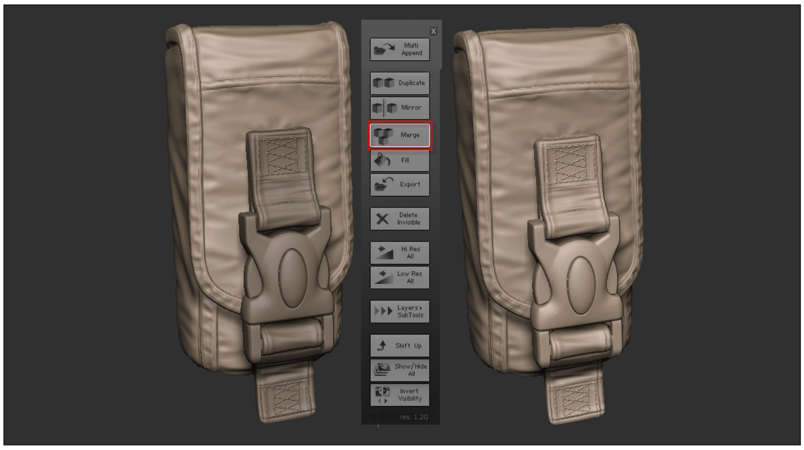


Fig 120

chapter 05

Pants (ZBrush Fabric Sculpting)

Chapter 05 - Pants (ZBrush Fabric Sculpting)

Software Used: ZBrush, 3ds Max, Silo, and Photoshop

Introduction

In the following chapter, we are going to see how to sculpt the pants from the basic concept we achieved in the first chapter. We are then going to introduce several accessories that we will integrate into it.

1. So let's start from the basic concept we achieved in Chapter 1 (**Fig.01**).

2. Basically we are going to follow the same procedure as we did in the last chapter and also for the shoe. The first stage involves polypainting the concept to use as a guide later on when reconstructing the topology (**Fig.02**).

3. Don't hesitate to re-read the previous chapter and to follow the step by step progress.

Here you can see the new mesh. In the second image you will notice that the top and the bottom are capped. It's still good to close your mesh in order to get a better texture (**Fig.03a – b**).

Fig 01

Fig 02

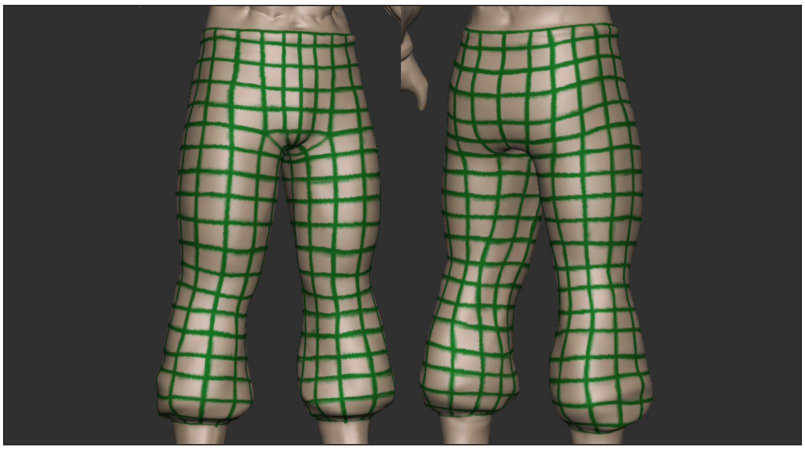


Fig 03a

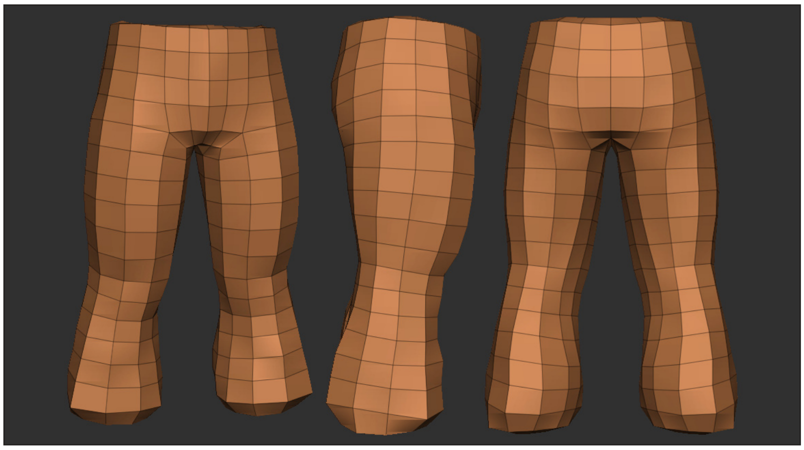
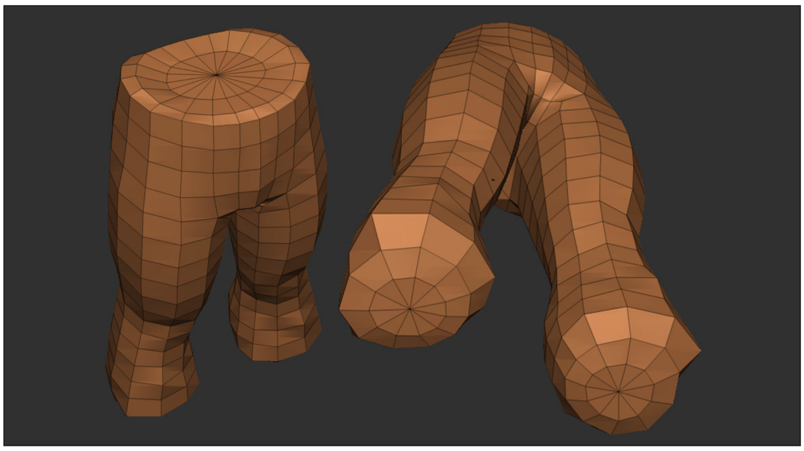
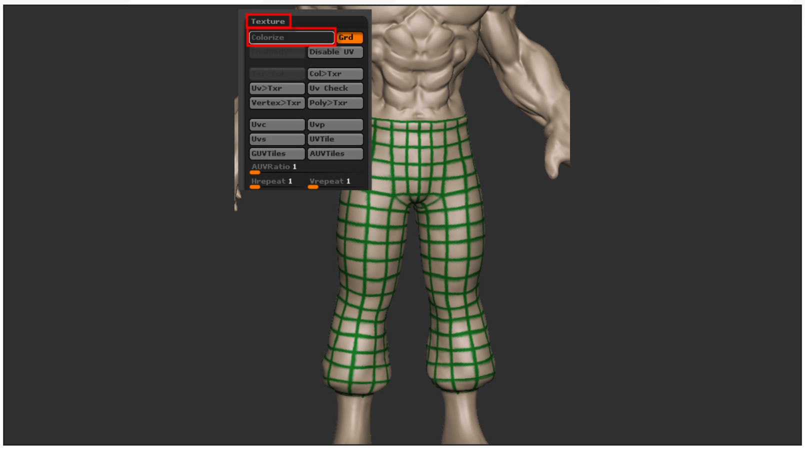


Fig 03b



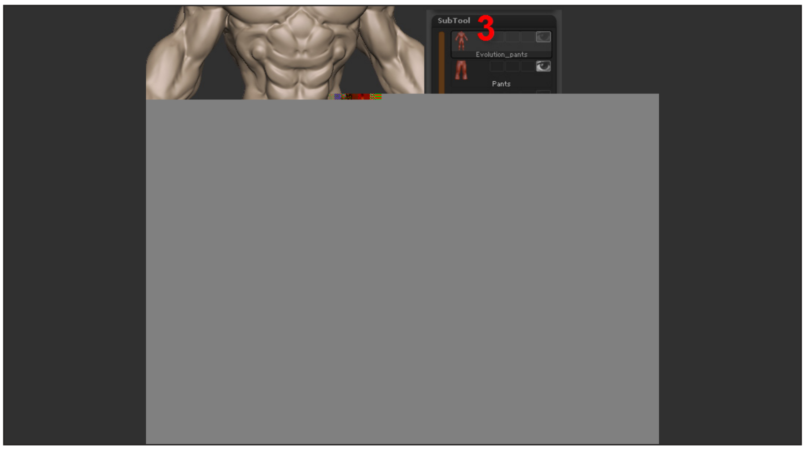
4. Now go back to your concept mesh as we are going to re-project all the information from the old version onto the new one. First of all turn off Colorize to hide Polypaint (**Fig.04**).

Fig 04



5. Under your Subtools, press Append to display the new menu that will allow you to select the new pants mesh. After selecting it you will see it just under your main Subtool (**Fig.05**).

Fig 05



6. Subdivide it several times but be careful to keep under 3 million polygons, otherwise you will have a lack of memory which will encroach on your workflow. You just need enough resolution to get a nice projection. Go to the bottom, open up the morph tab and press Store in order to store this current state in the memory (**Fig.06**).

Fig 06

7. Press "Project All" to transfer all the information from the old mesh onto the new version. As you can see below, you may have some artifacts. This phenomena comes from the polygons you created to cap the mesh but there is no need for concern as the morph will allow you to fix these bugs (**Fig.07a - b**).

Fig 07a

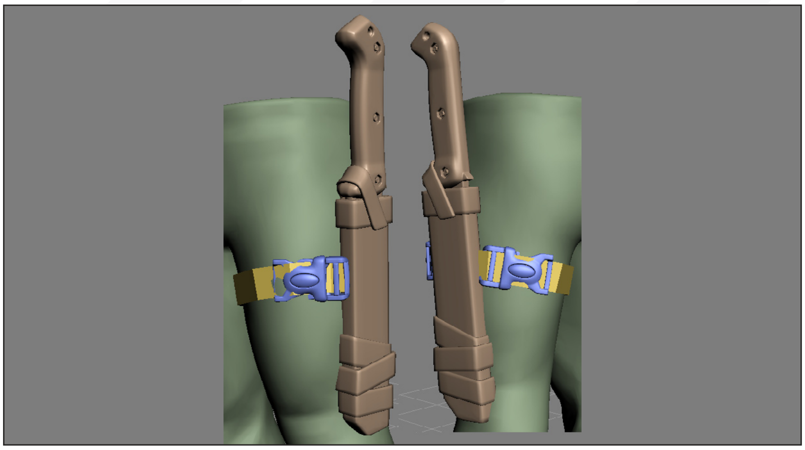


Fig 19b

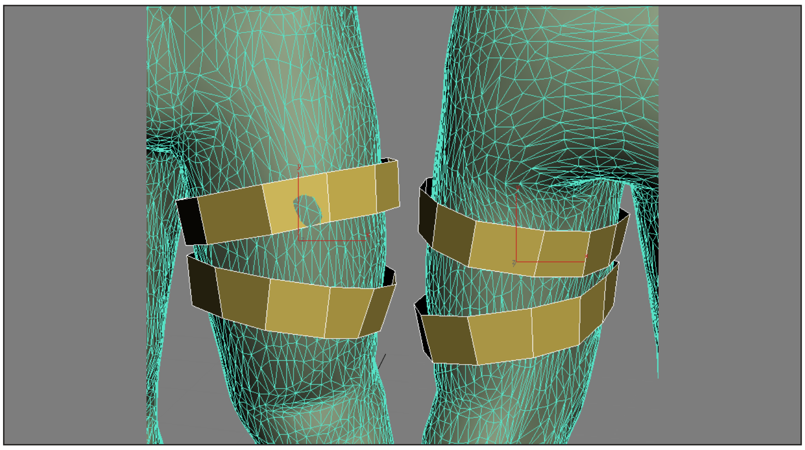


Fig 20a

20. Create another strap below the first one by using the same steps, adding more clips to get the following preview (**Fig.20a – b**).

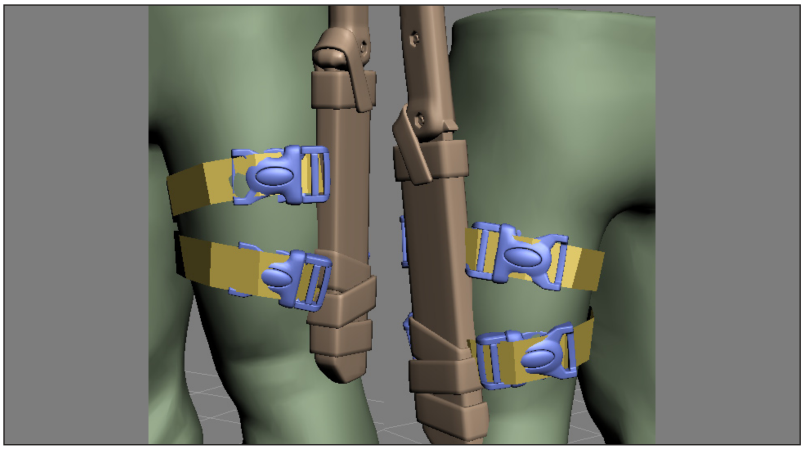


Fig 20b

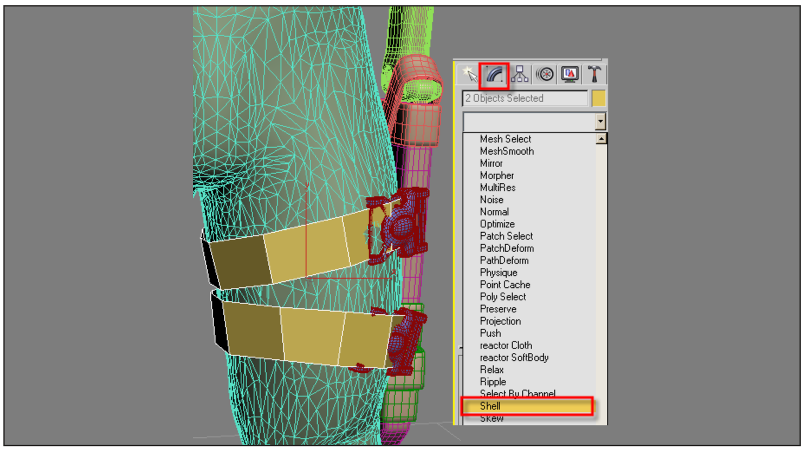
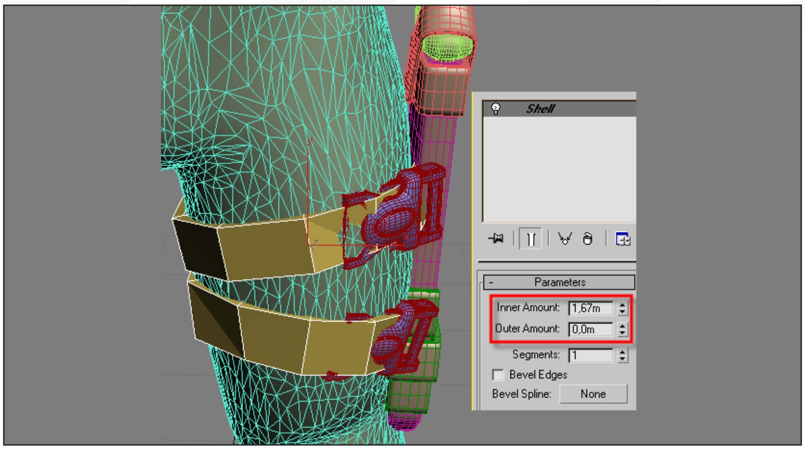


Fig 21

21. We are now going to create some thickness to the straps. Under the Modifier tab, open the roll out and select Shell (**Fig.21**).

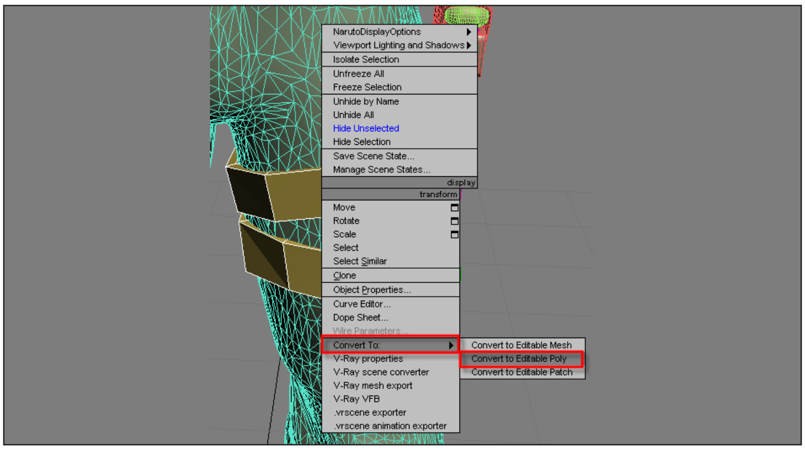
22. It's up to you then to try and choose the best parameters in order to create realistic proportions (**Fig.22**).

Fig 22



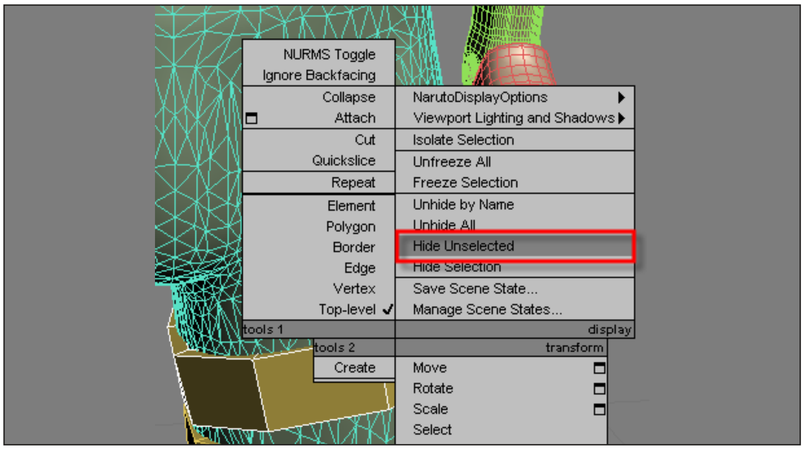
23. Once satisfied, convert both elements to an Editable Poly to collapse the modifier stack and keep it simple (**Fig.23**).

Fig 23



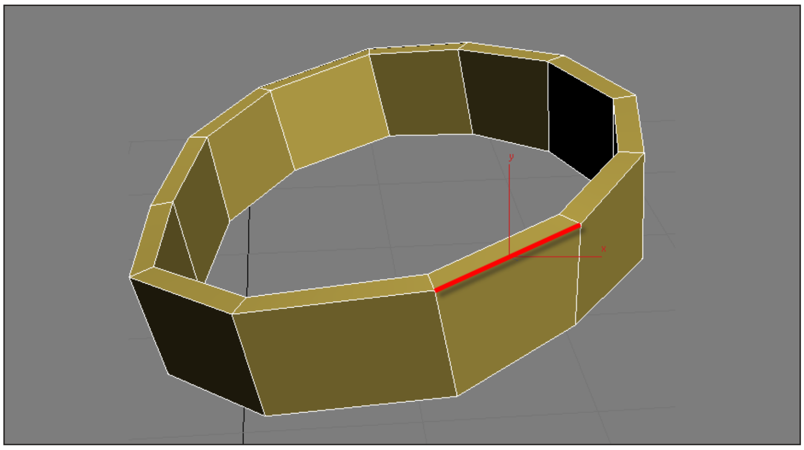
24. We are now going to "prepare" the mesh and so in order to do that hide everything except the strap (**Fig.24**).

Fig 24



25. Select one edge (**Fig.25**).

Fig 25



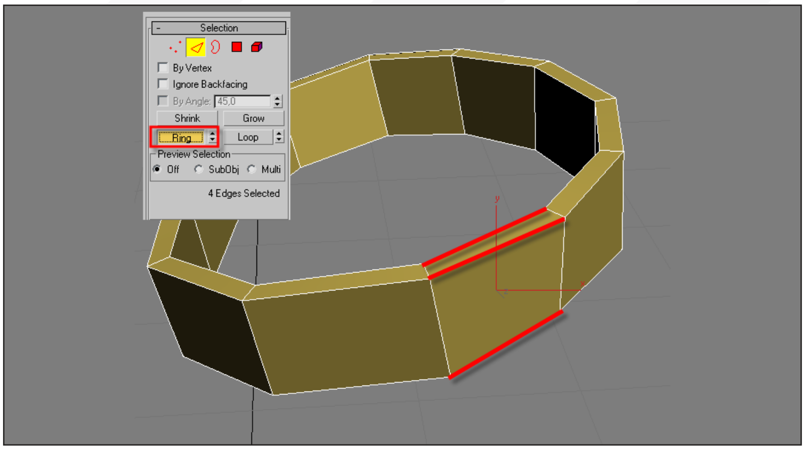


Fig 26

26. Press on Ring to select the ring loop (**Fig.26**).

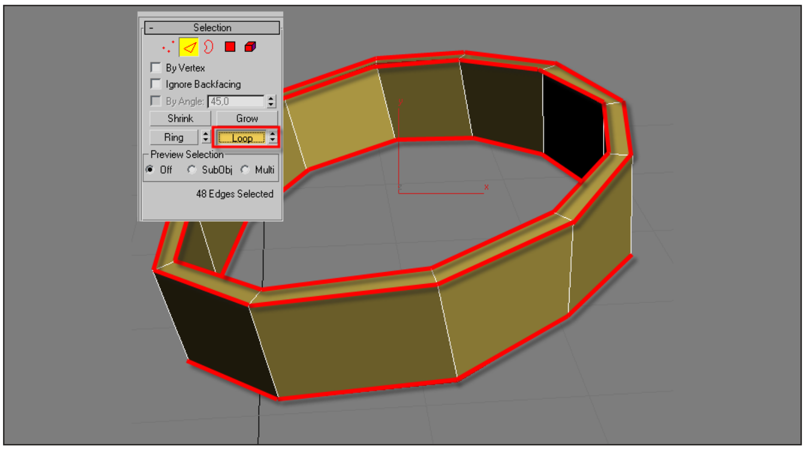


Fig 27

27. Now click on Loop to select the corresponding edge loops (**Fig.27**).

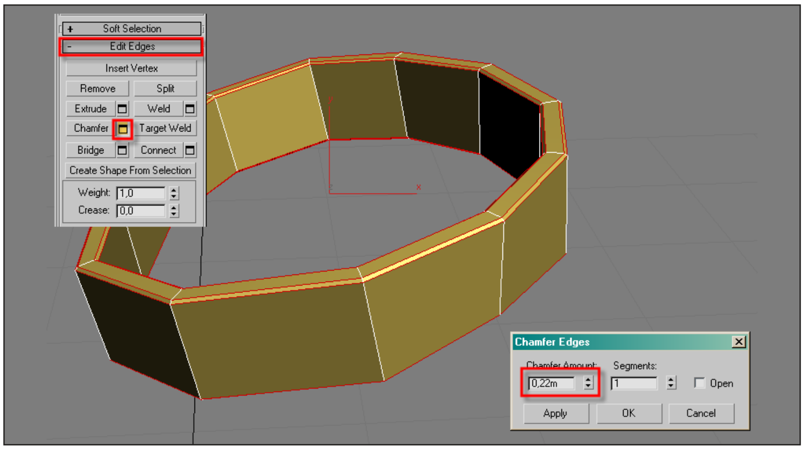


Fig 28

28. Now you can chamfer the edge loops in order to get sharper angles when you have to sculpt the strap within Zbrush where it will be much easier to achieve a better result (**Fig.28**).

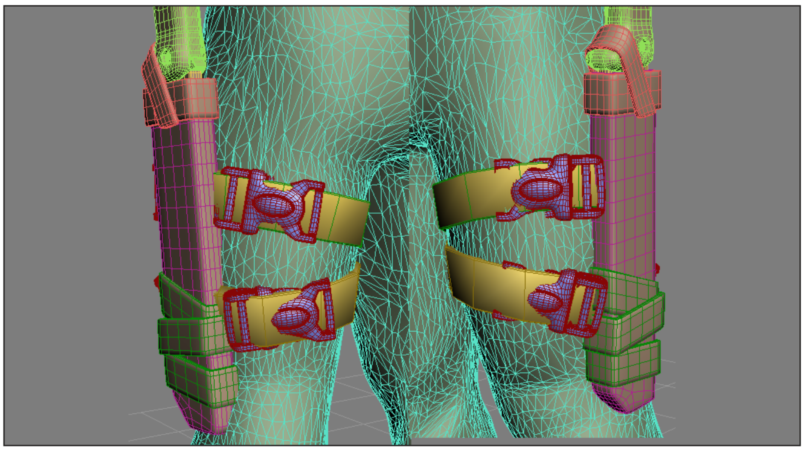
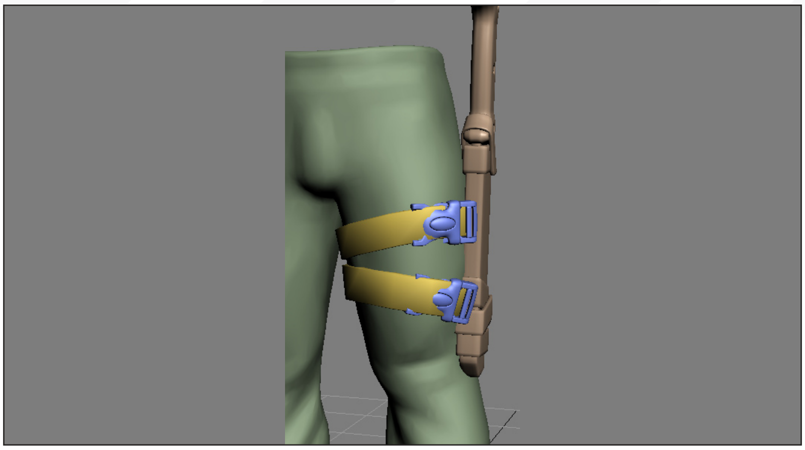


Fig 29

29. Apply this to the second one below. Here is a current preview (**Fig.29**).

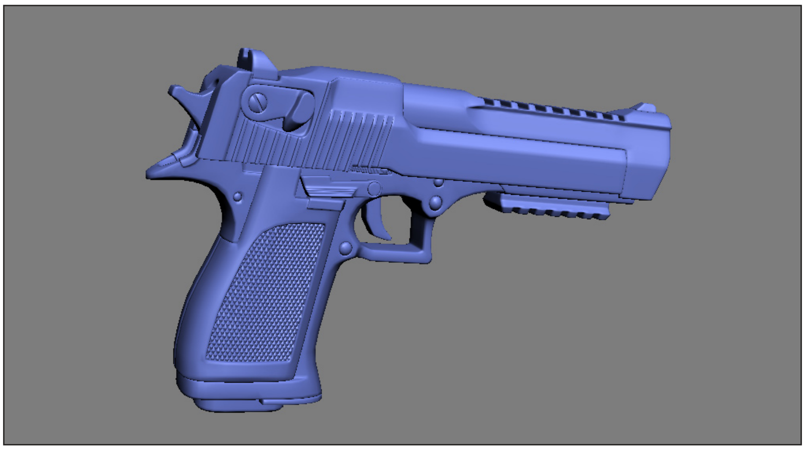
30. Here is another preview without the wire (**Fig.30**).

Fig 30



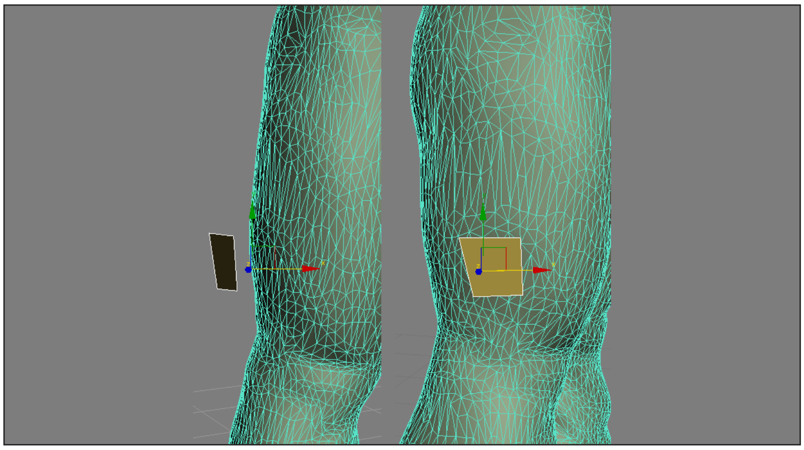
31. It's now the time to re-use the Desert Eagle you created previously as we are going to create a holster for it (**Fig.31**).

Fig 31



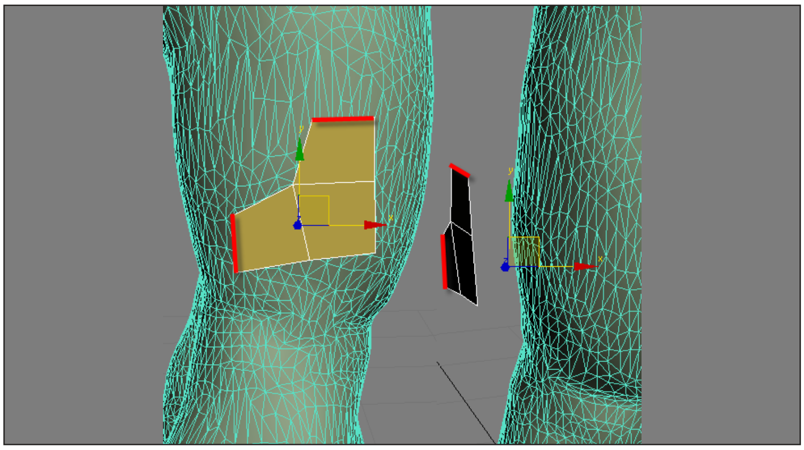
32. As we did with the straps above, use the same technique to create the holster, edge by edge (**Fig.32**).

Fig 32



33. Extrude the edges as shown below (**Fig.33a – b**).

Fig 33a



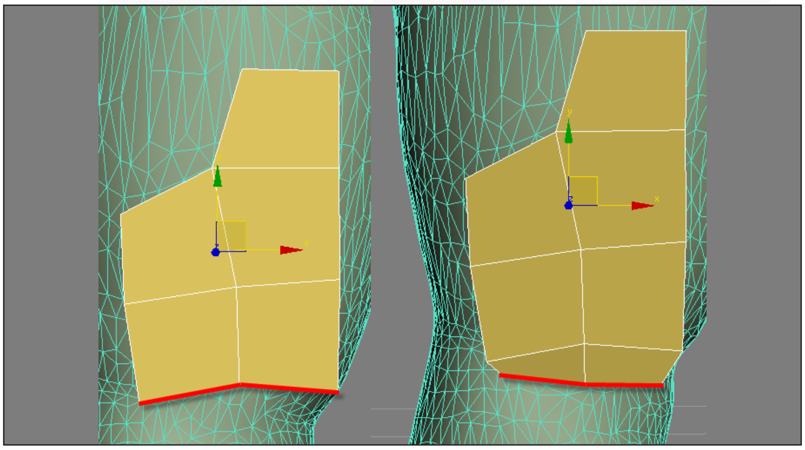


Fig 33b

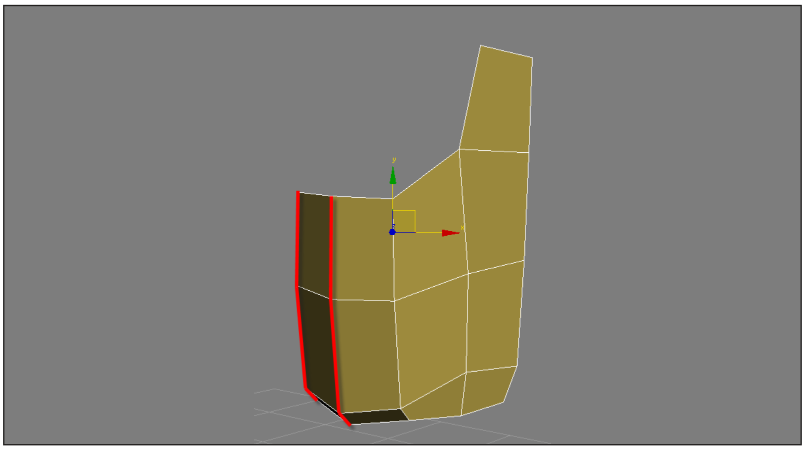


Fig 34

34. Don't hesitate to hide everything except the current object in order to see what you are doing. Continue to extrude the edges by pressing shift (**Fig.34**).

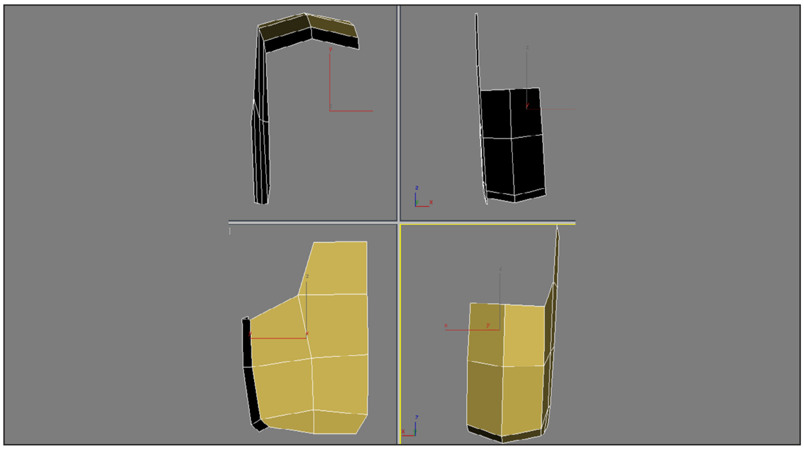


Fig 35

35. Here is a current preview from several angles (**Fig.35**).

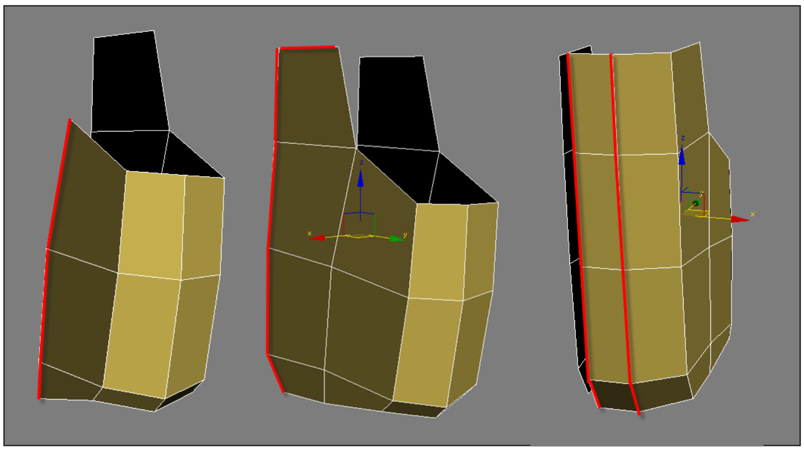
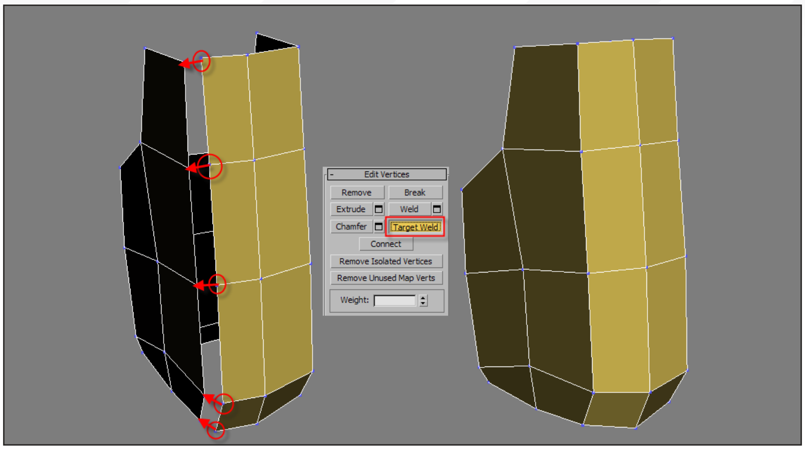


Fig 36

36. Extrude the edges step by step (**Fig.36**).

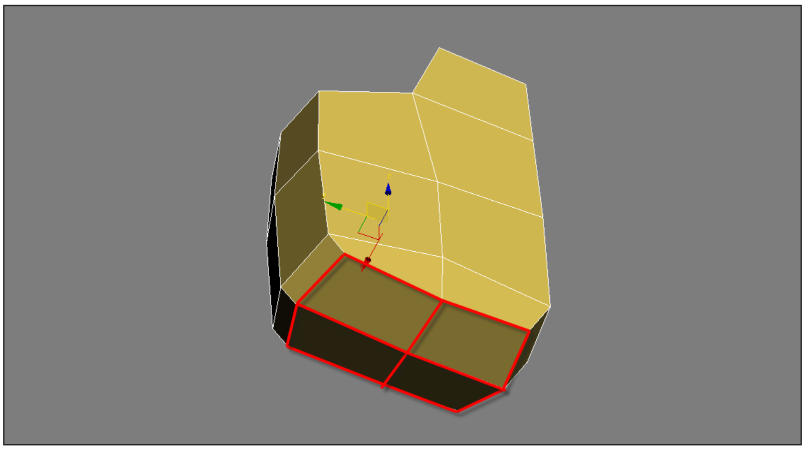
37. In order to "close" the mesh, use the Target Weld Function to snap and weld corresponding vertices (**Fig.37**).

Fig 37



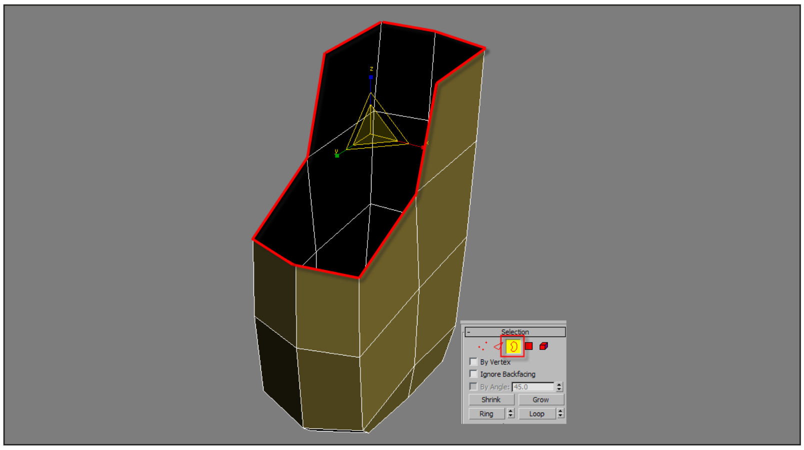
38. Cap the bottom but don't forget it's important to keep the mesh as quads as this will remove any bugs and artifacts in ZBrush (**Fig.38**).

Fig 38



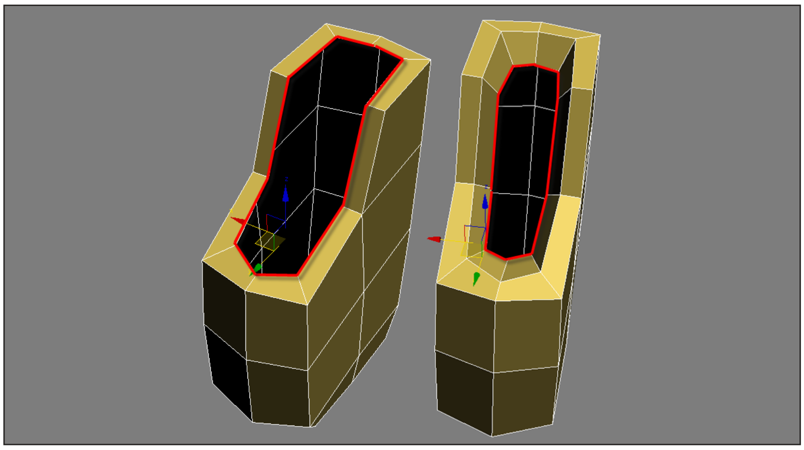
39. Follow the same procedure on the top. Select all the edges by using the Border selection mode (**Fig.39**).

Fig 39



40. Whilst pressing shift, extrude the border and scale it down (**Fig.40**).

Fig 40



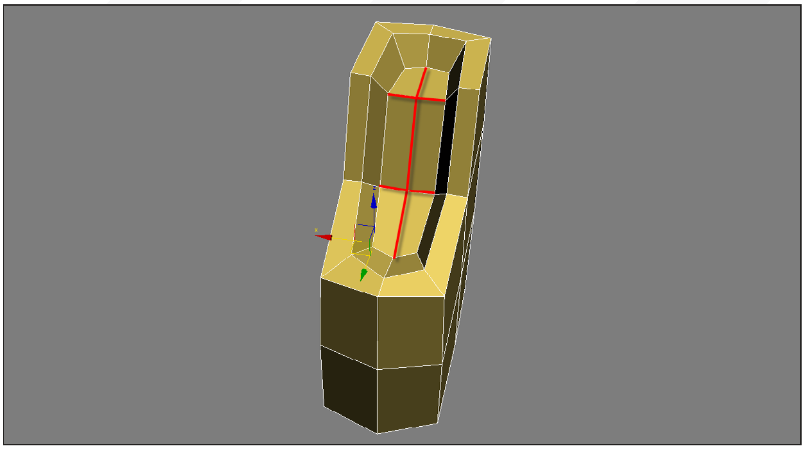


Fig 41

41. Once done close it properly with quads (**Fig.41**).

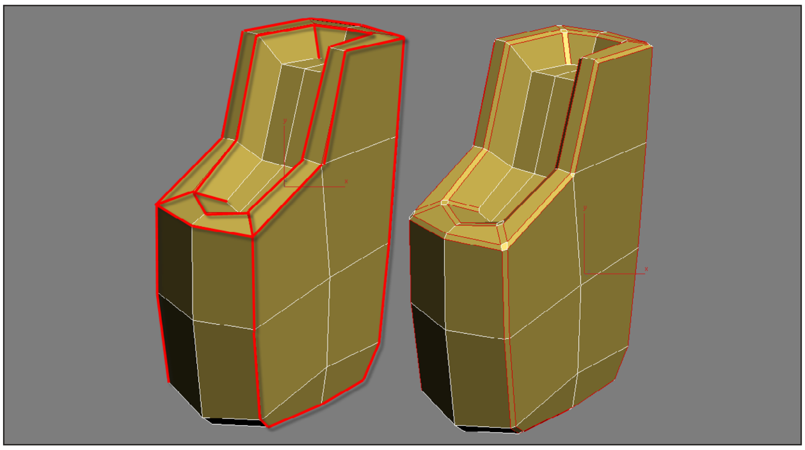


Fig 42

42. As we did for the straps, we are going to sharpen some edges to simplify the work in Zbrush.

Select the edges as shown below (**Fig.42**).

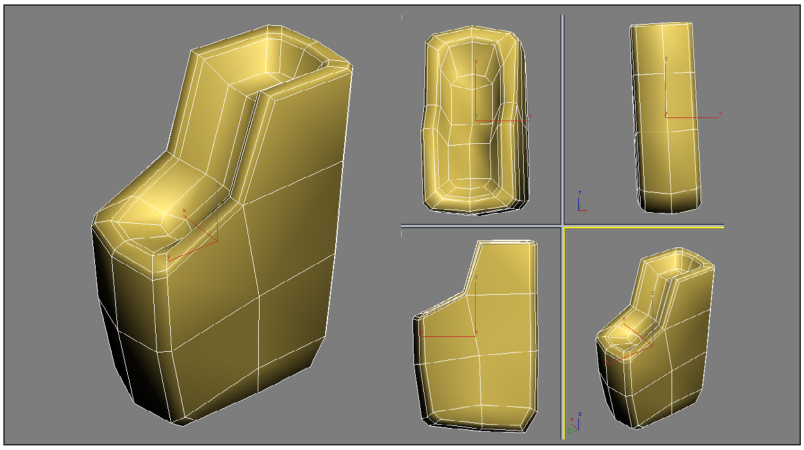


Fig 43

43. Here are some other previews from several angles (**Fig.43**).

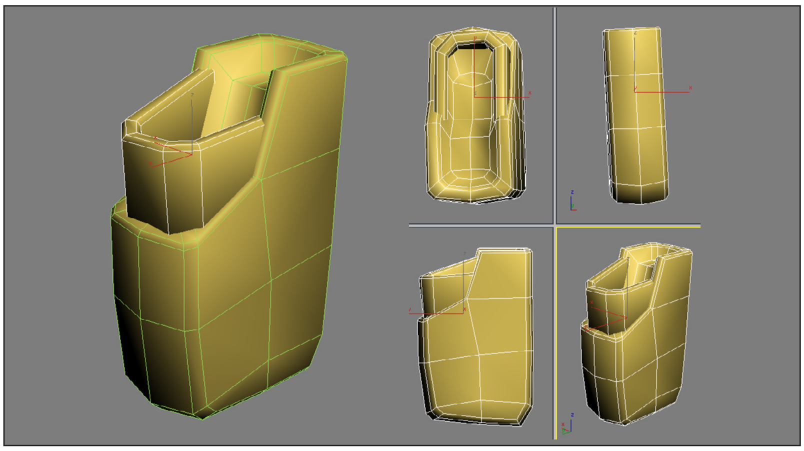
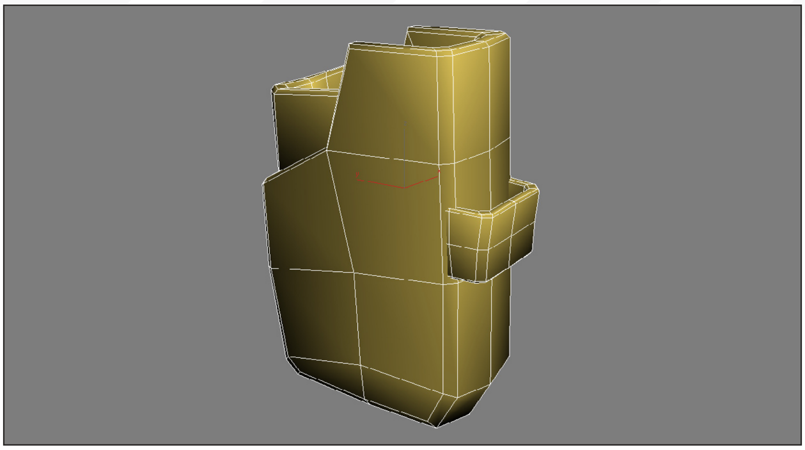


Fig 44

44. Add a mini strap using the same technique as shown below (**Fig.44**).

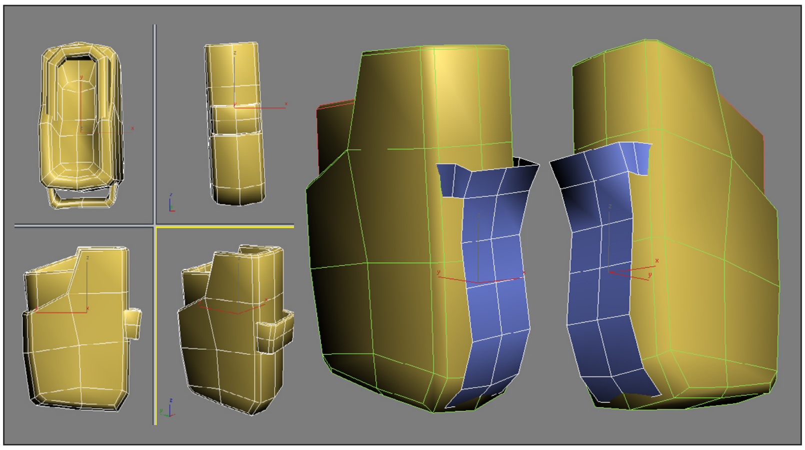
45. An a further one on the side (**Fig.45**).

Fig 45



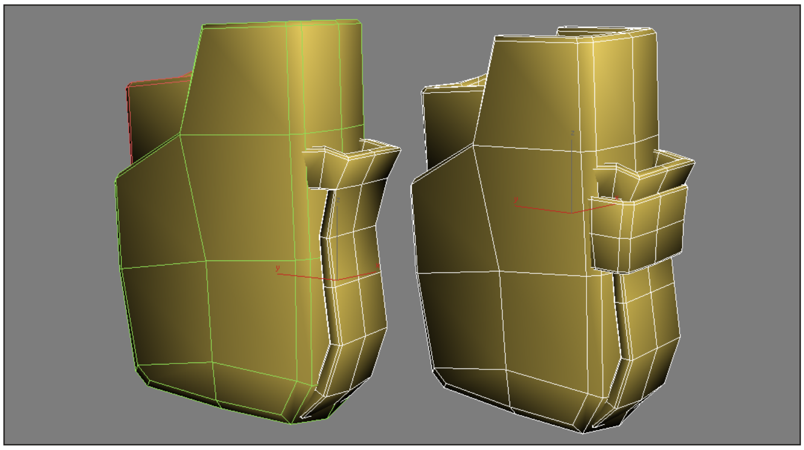
46. We are going to create more elements in order to add extra detail. Usually it's better to have one object with several sub objects rather than a complete mesh entirely sculpted (**Fig.46**).

Fig 46



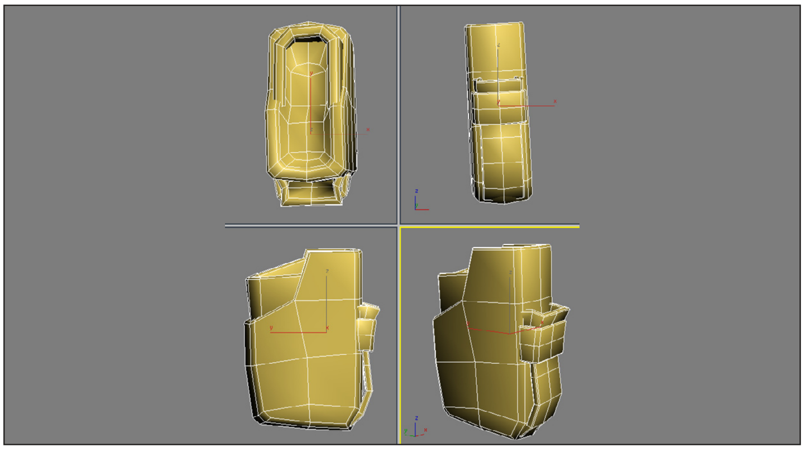
47. Use the same procedure as we have done previously (**Fig.47**).

Fig 47



48. Here are some more views to show the main shape and silhouette (**Fig.48**).

Fig 48



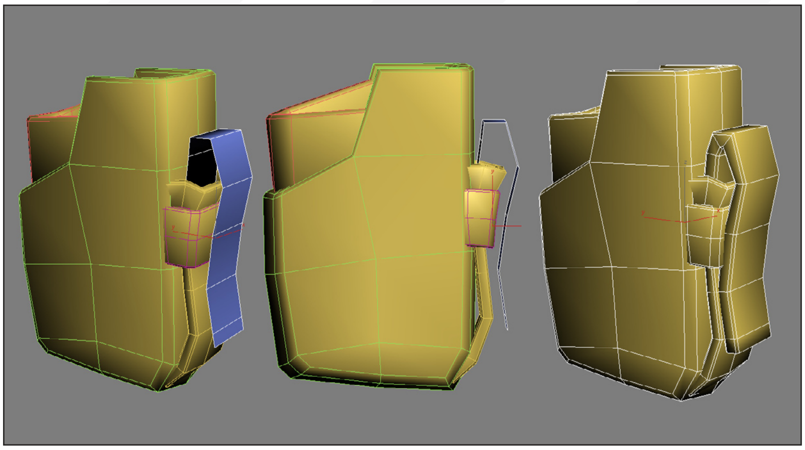


Fig 49a

49. Don't hesitate to look at references for the details with Google often being your best friend. Here is one more strap (**Fig.49a – b**).

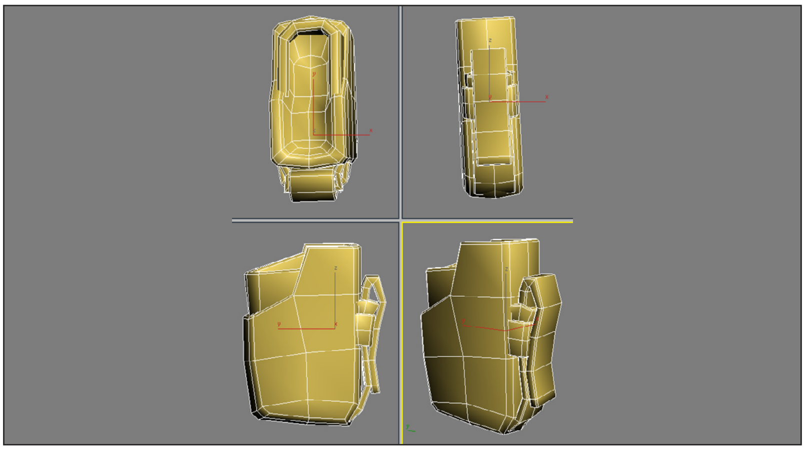


Fig 49b

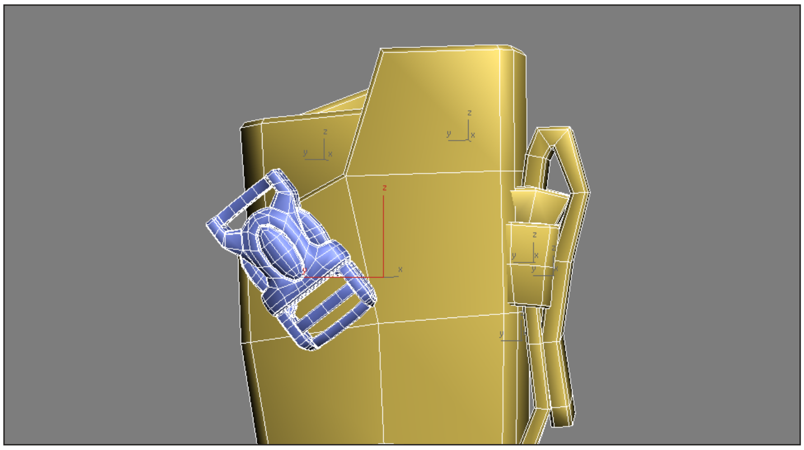


Fig 50

50. Feel free to re-use the clips (**Fig.50**).

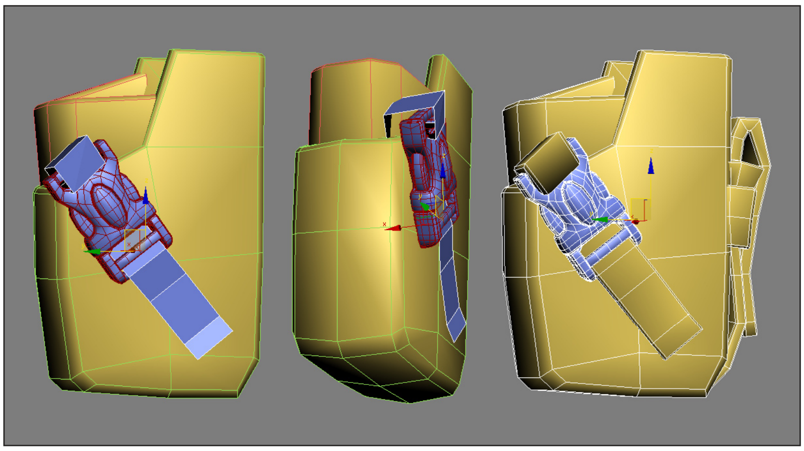


Fig 51a

51. Here are a few more images to show the extra straps (**Fig.51a – c**).

Fig 51b

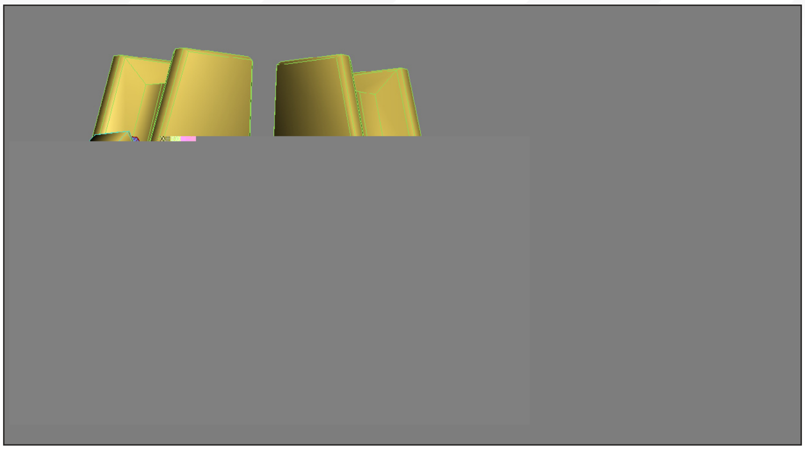
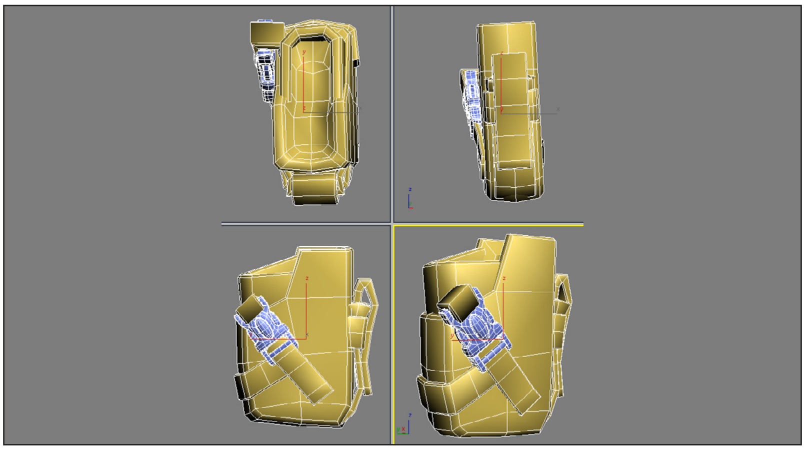


Fig 51c

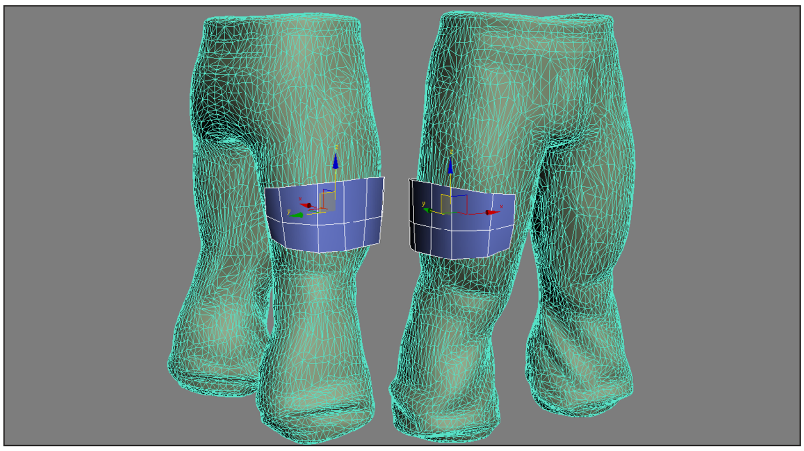


52. You have now your holster where you can house your weapon (**Fig.52**).

Fig 52

53. Let's add some more accessories on the thigh to accommodate the holster and also add more definition (**Fig.53**).

Fig 53



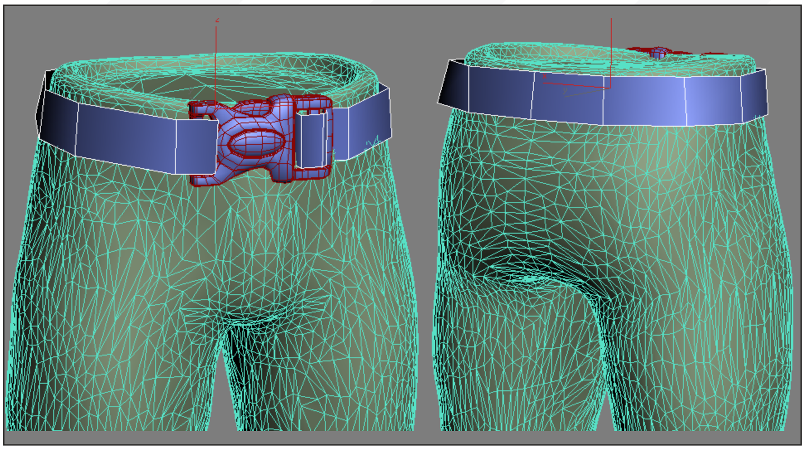


Fig 60a

60. Thanks to this clip, you can figure out the placement of the main strap and add its thickness (**Fig.60a – b**).

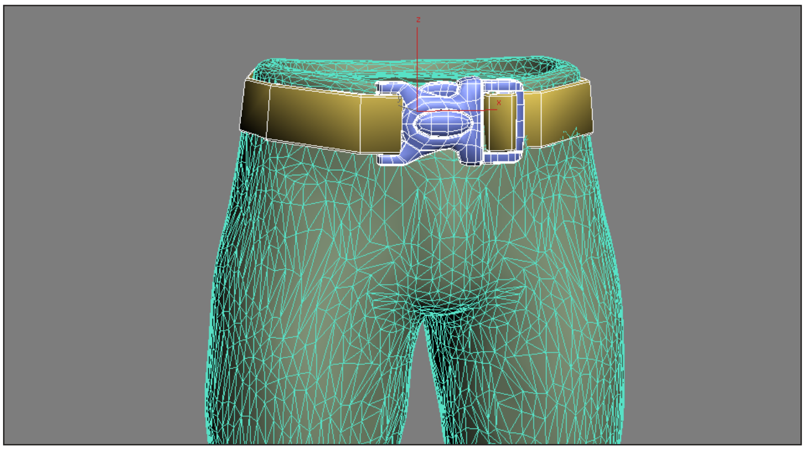


Fig 60b

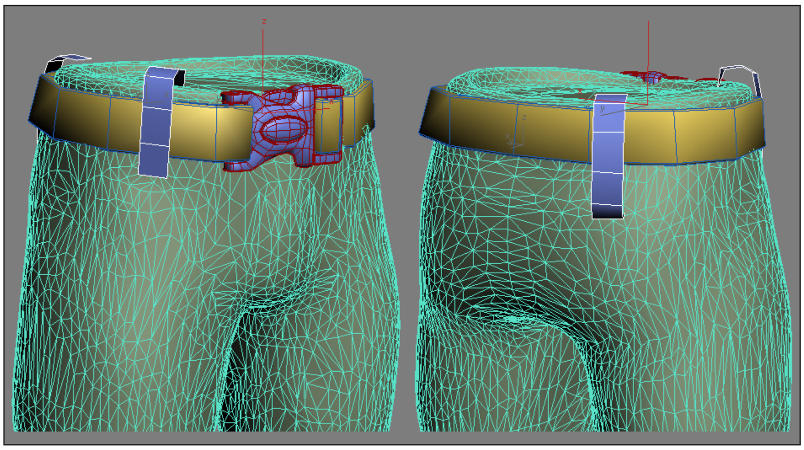


Fig 61a

61. Now it's time to create the small pieces of cloth to support the main strap as seen commonly on a pair of jeans. Once again, apply the thickness modifier and chamfer the edges (**Fig.61a – b**).

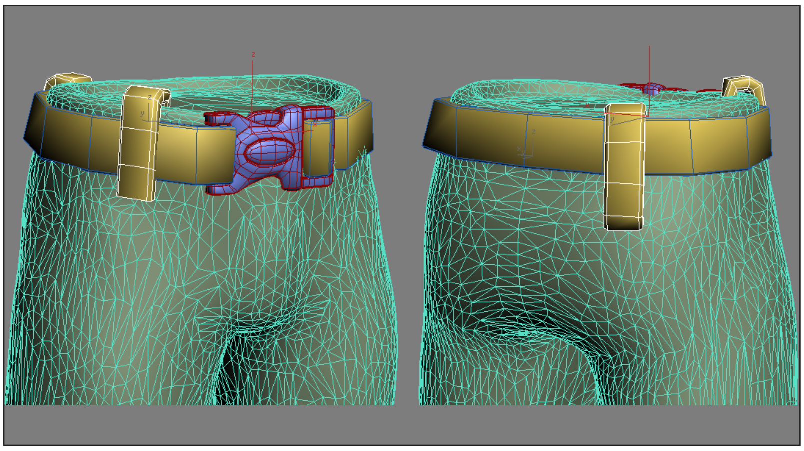
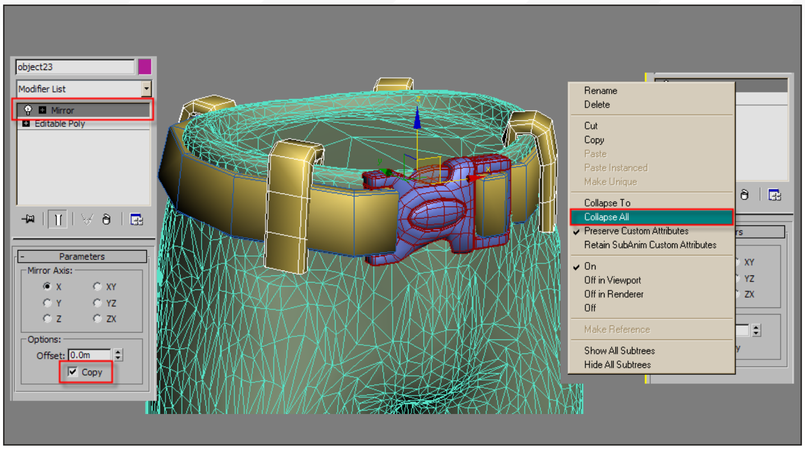


Fig 61b

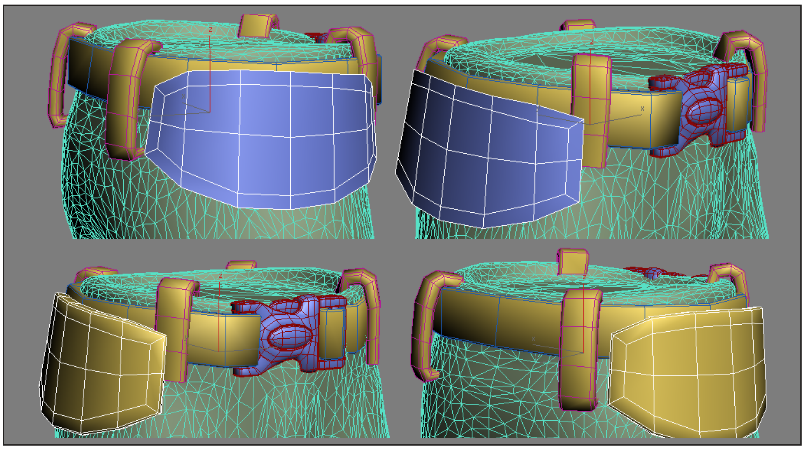
62. To make the new objects symmetrical, apply the Mirror modifier as shown below (**Fig.62**).

Fig 62



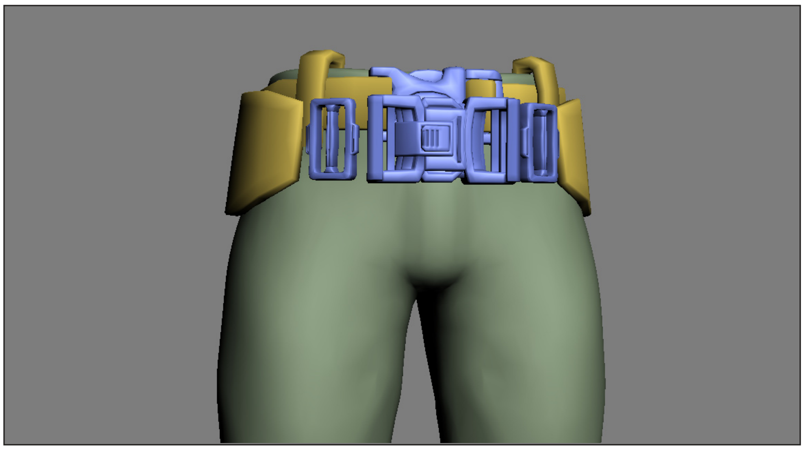
63. Create another piece which will essentially protect the upper thigh area (**Fig.63**).

Fig 63



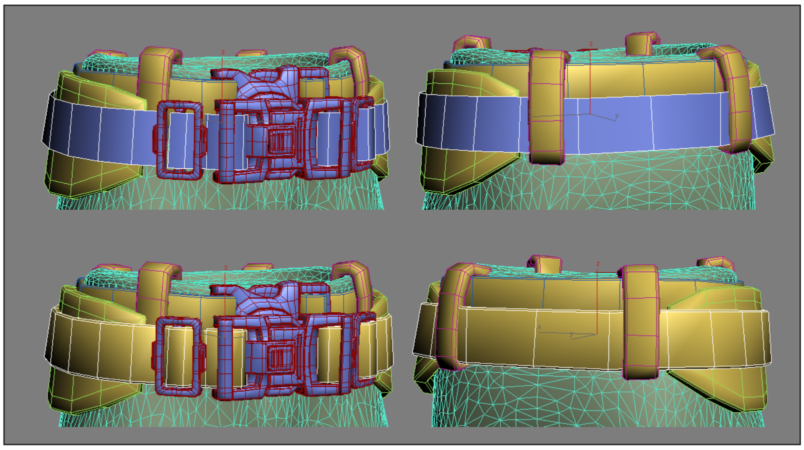
64. Place on some more accessories to prepare for another strap (**Fig.64**).

Fig 64



65.Create this strap/belt and finish it correctly (**Fig.65**).

Fig 65



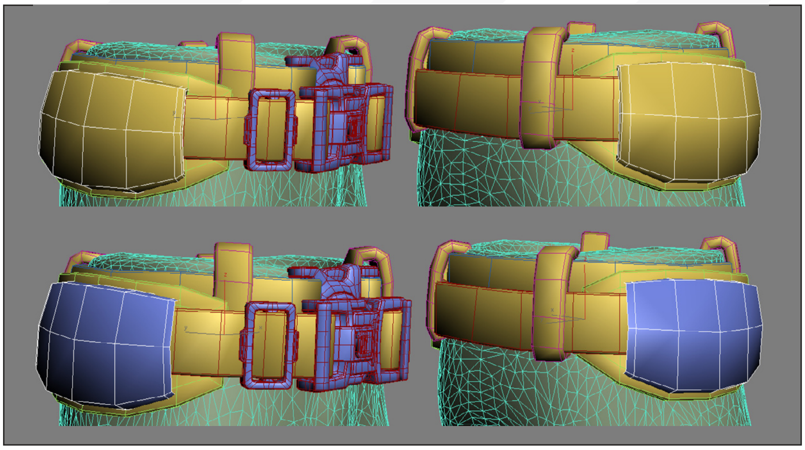


Fig 66

66. You can find some references for these kinds of pieces on American Marines (**Fig.66**).

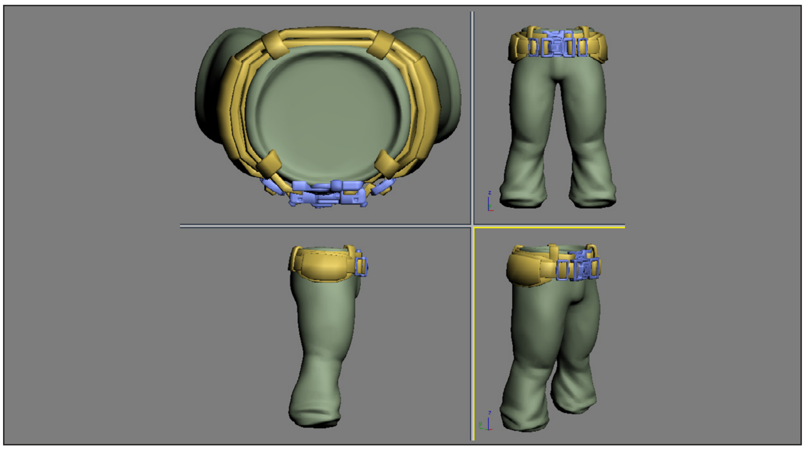


Fig 67

67. Here are some other views of the current model (**Fig.67**).

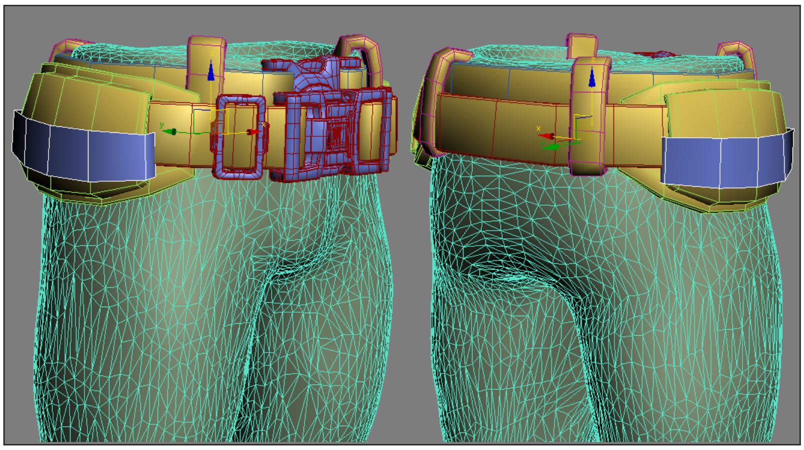


Fig 68a

68. Here is another piece (**Fig.68**).

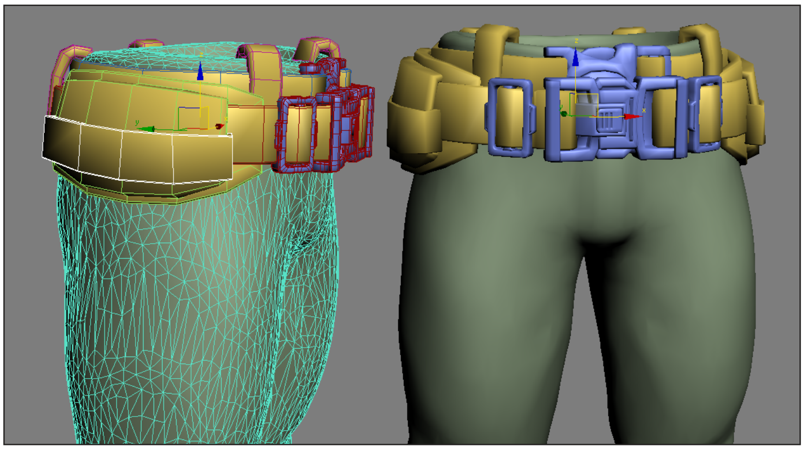


Fig 68b

69. Create one more protective piece, duplicate it to add more detail and then duplicate this double piece and place them at the back (**Fig.69a – d**).

Fig 69a

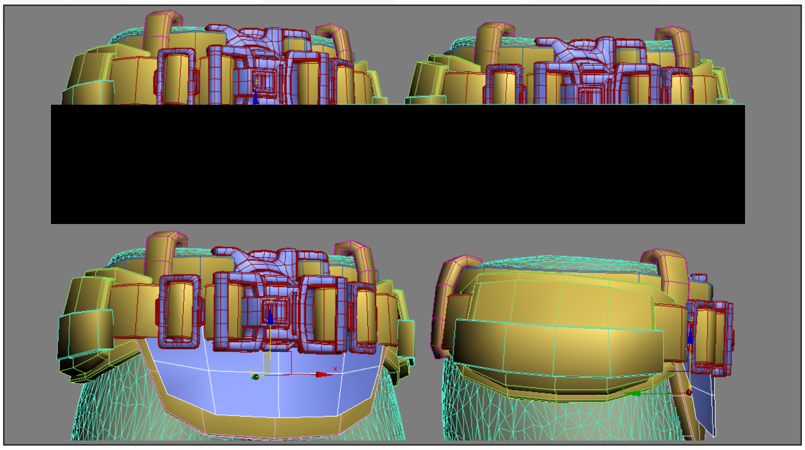


Fig 69b

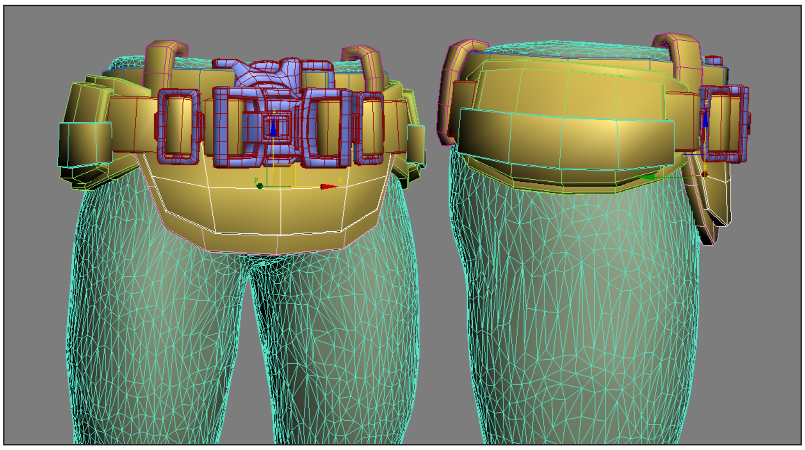


Fig 69c

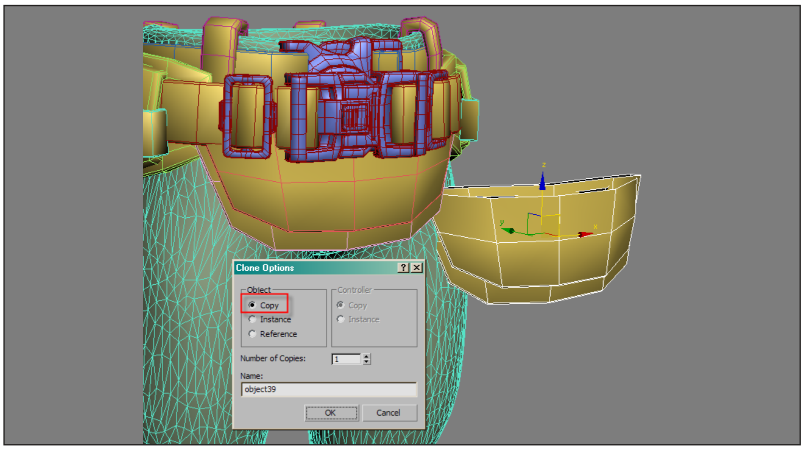
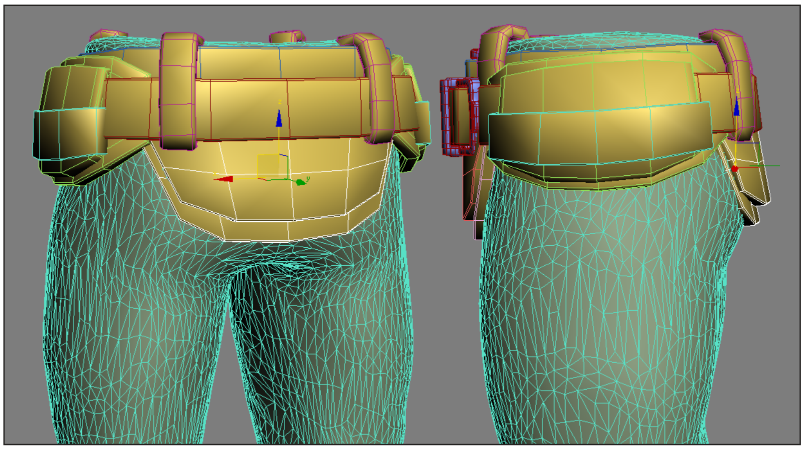


Fig 69d



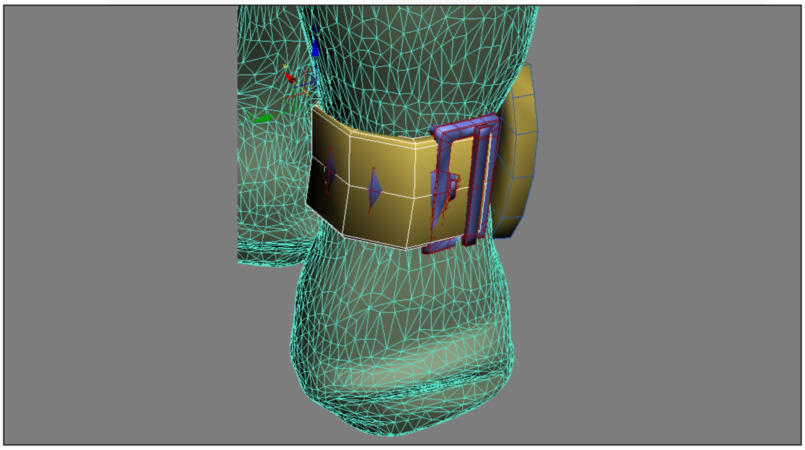


Fig 75

75. Next add some thickness (**Fig.75**).

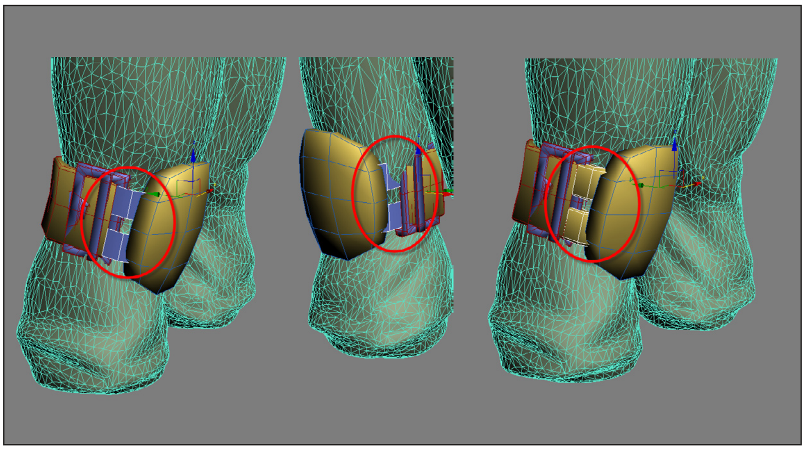


Fig 76

76. Create some small straps to link the knee protector to the clips and once again add some thickness (**Fig.76**).

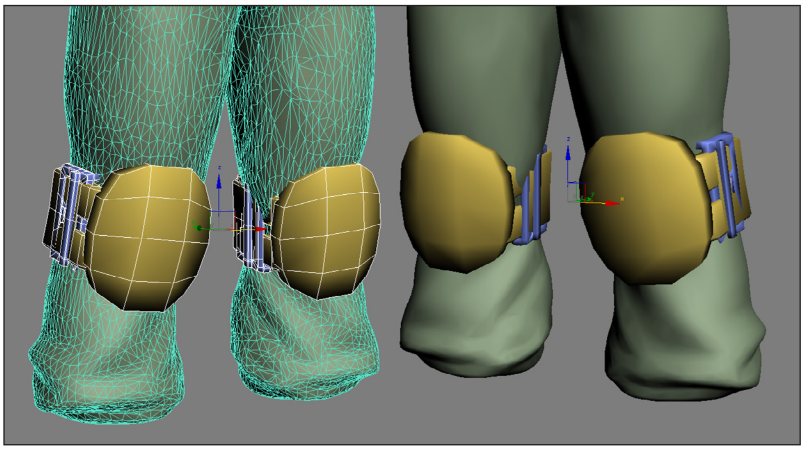


Fig 77

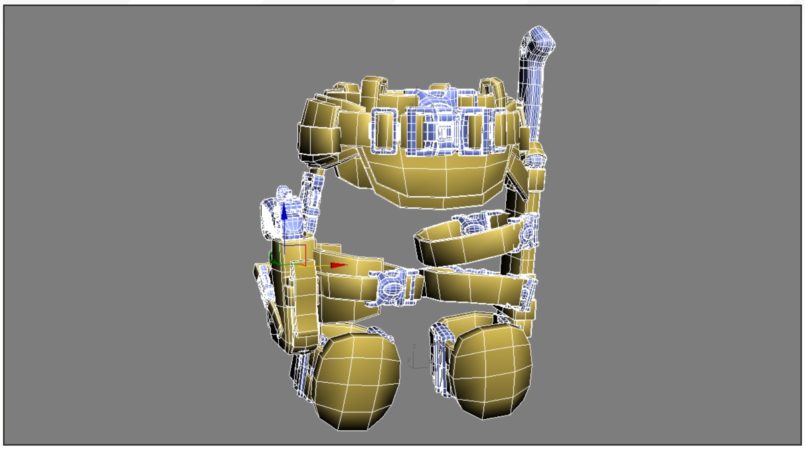
77. Here is a current preview from different angles (**Fig.77**).

Fig 78

78. Here is a final preview of all the accessories (**Fig.78**).

79. Export only the newly created accessories as .obj files from 3ds max. We will import these later into Zbrush to be sculpted (**Fig.79**).

Fig 79



80. Open up your Zbrush shoe file. We are going to use the main shoe object as a reference in the pants Zbrush file to help sculpt the pants and accessories (**Fig.80**).

Fig 80

81. Click on the Frame button on the right and you will see several colors appear on the shoe that correspond to the different objects. We just need the biggest one without the laces and everything else (**Fig.81**).

Fig 81

82. Now click on GrpSplit in the SubTool Tab and you will see more Subtools appear in the list. You can now delete everything one by one except the first one which corresponds to the main shoe object, as shown on the right (**Fig.82**).

Fig 82

Fig 83

83. You now have only one Subtool in the list and you will notice that this element has lost its subdivision history. Subdivision history is really important if you want to save memory and be able to sculpt smoothly. To recover subdivisions just press on Reconstruct Subdiv several times. As long as we just need a reference of the shoe you could also delete the higher level of subdivision as shown in step 3 (**Fig.83**).

Fig 84

84. Here is a final preview of the shoe reference. There is just enough to help you when working on the rest of the pants (**Fig.84**).

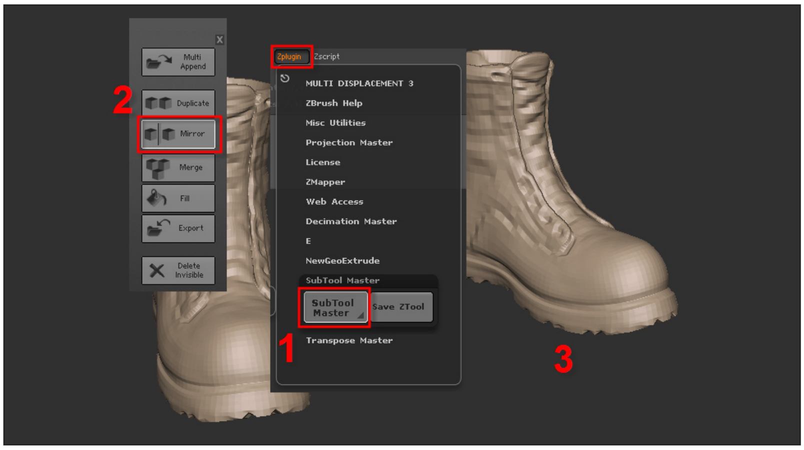


Fig 85

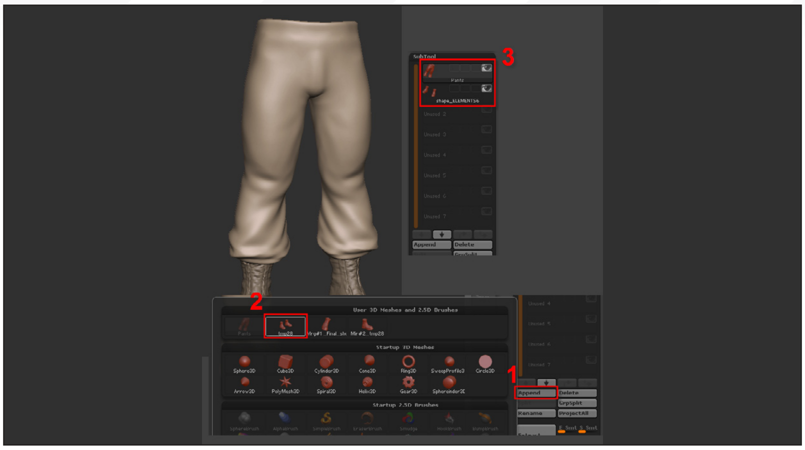
85. Once again use the Plugin SubTool Master to mirror the shoe (**Fig.85**).

Fig 86

86. Now go back to your simple pants you created at the beginning of this chapter (**Fig.86**).

87. Append the shoes you just created above (**Fig.87**).

Fig 87



88. Finally, append the accessories that you created in 3dsmax by using SubTool Master. You should arrive at something close to the second picture (**Fig.88a – b**).

Fig 88a

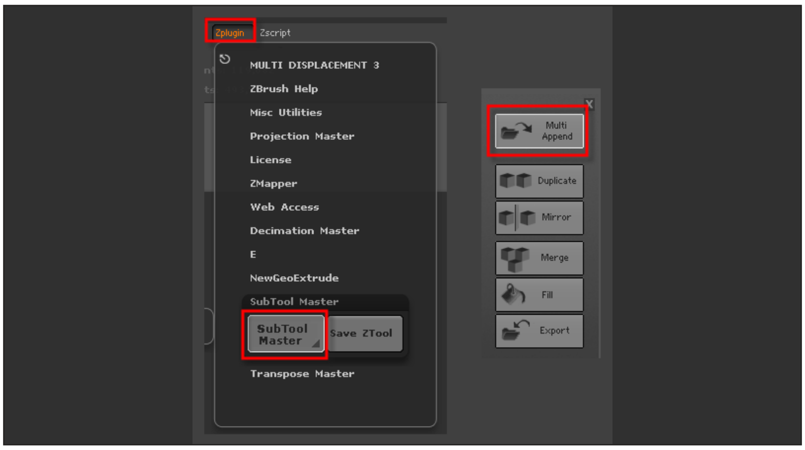


Fig 88b

89. In order to work properly on single elements click on GrpSplit and you should then see many more SubTools appear on the right. It would be easier to work on them one at a time which will also be much better for memory as you could easily end up with over 10 million polygons without any restrictions (**Fig.89**).

Fig 89

Fig 90

90. You can now add more subdivisions to the objects in preparation for the sculpting (**Fig.90**).

Fig 91

91. Now let's work on the first element; the pelvic protectors. Before starting do not hesitate to add more subdivisions (**Fig.91**).

Fig 92

92. To be able to work properly without being disturbed by any other objects you can hide them by simply clicking on the eye button just to the right of your current SubTool (**Fig.92**).

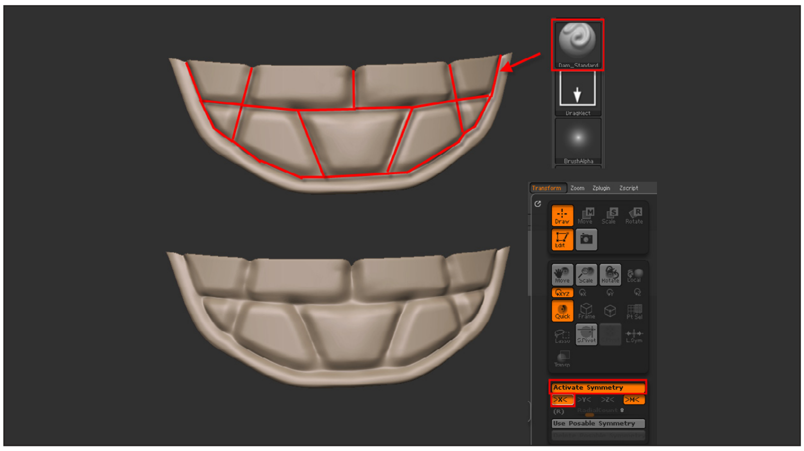
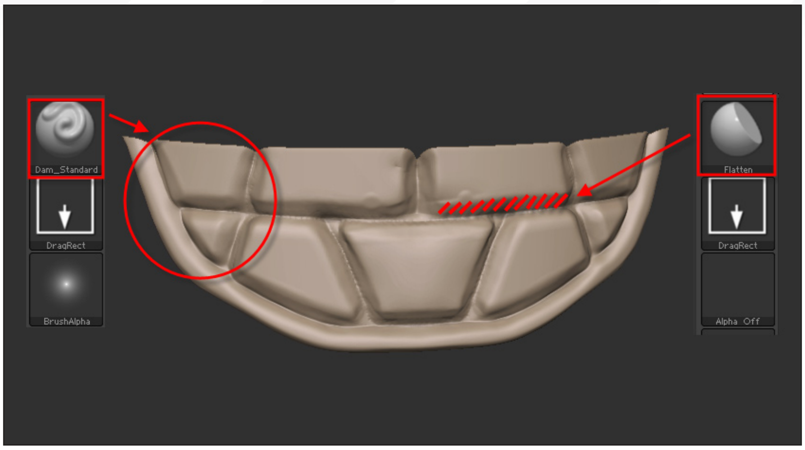


Fig 93

93. Dam Standard will be used once again to "draw" the main lines but don't forget to turn the symmetry on (**Fig.93**).

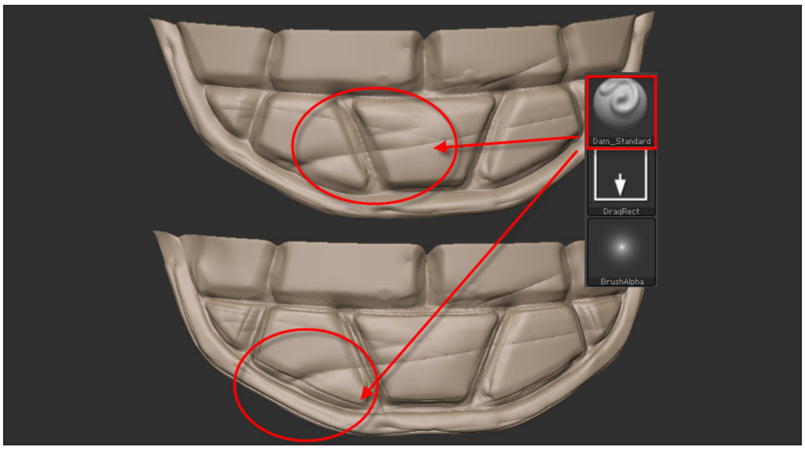
94. Use now the Flatten brush to flatten some areas as shown below and the Dam Standard brush to polish and sharpen any holes and details (**Fig.94**).

Fig 94



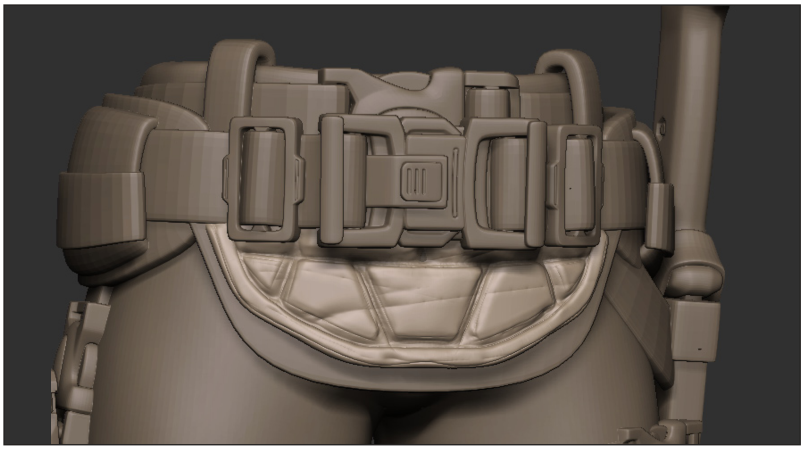
95. For the final scratch touches keep using the Dam Standard brush and draw some natural lines to suggest that the object is actively used (**Fig.95**).

Fig 95



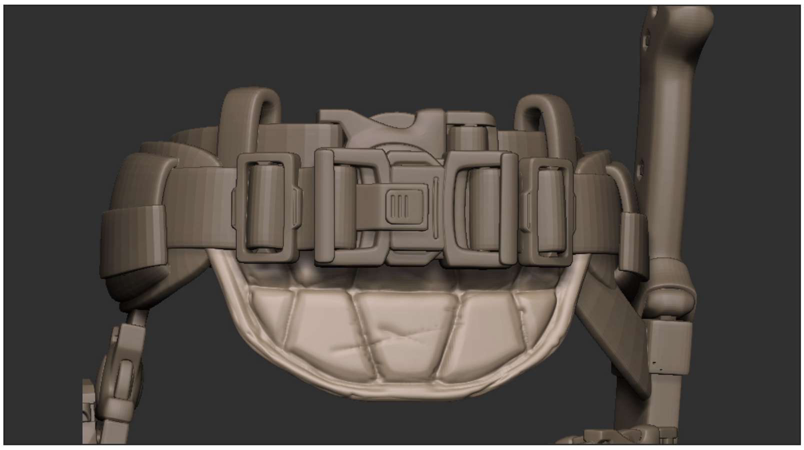
96. Here is a final preview (**Fig.96**).

Fig 96



97. Follow the same procedure for the pelvic protector situated underneath (**Fig.97a – b**).

Fig 97a



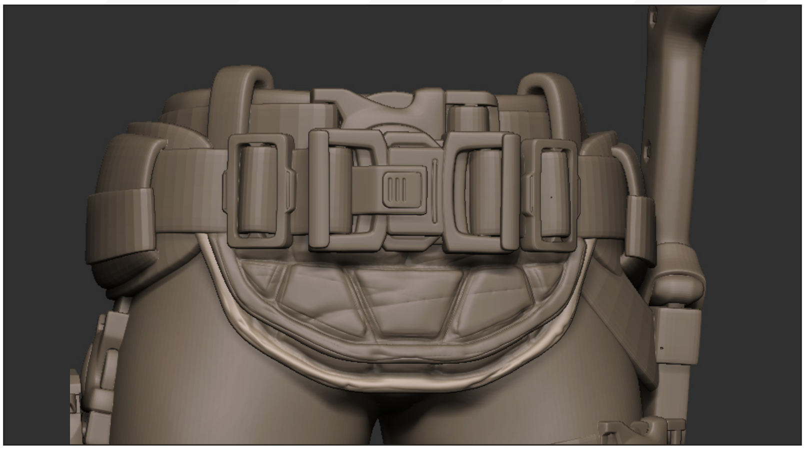


Fig 97b

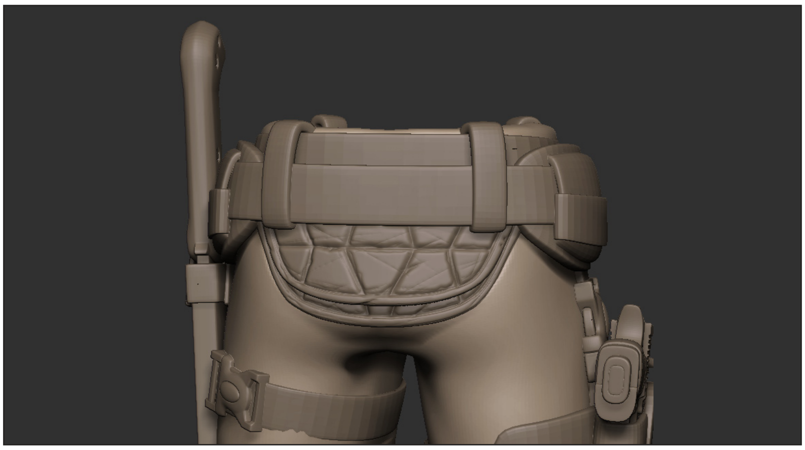


Fig 98

98. And likewise for the ones at the back (**Fig.98**).

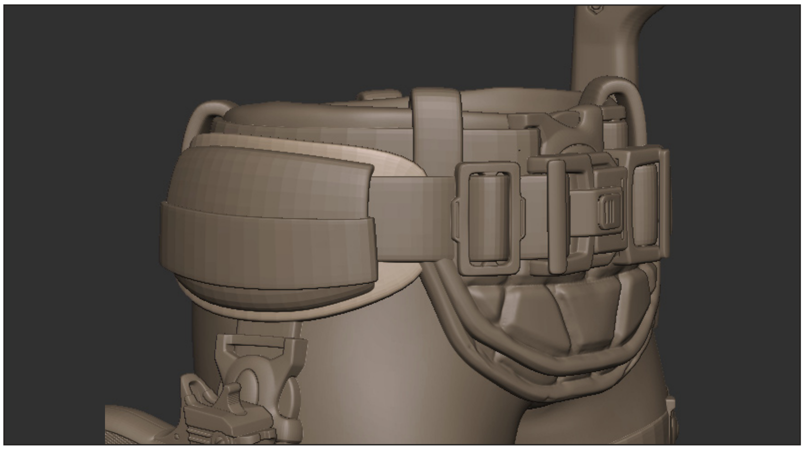


Fig 99

99. Now let's work now on another one as shown below (**Fig.99**).

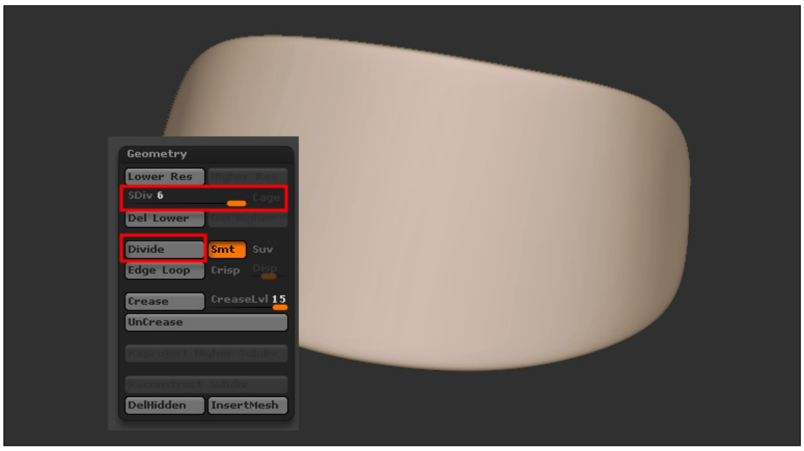


Fig 100

100. First of all subdivide it (**Fig.100**).

101. Don't forget to activate the symmetry – something which has to be done for all the SubTools as it's not a general option (**Fig.101**).

Fig 101

102. A very nice Brush is the Slash2 and thanks to this you will be able to create extra pieces of cloth apparent on jeans. Select the Slash2 Brush and activate LazyMouse making sure not to forget to change the LazyStep value to 0 in order to get a perfect line. Now right click and move down the Z intensity value to reduce the brush strength. You can now draw a line around your object as shown below (**Fig.102**).

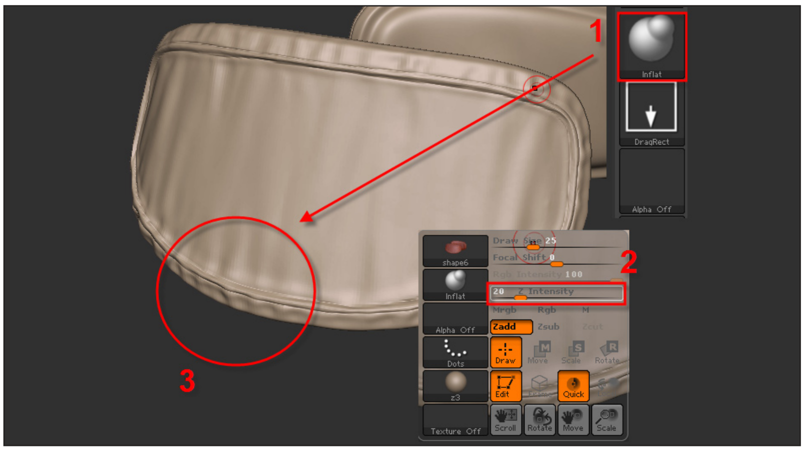
Fig 102

103. Thanks to a customized brush (created by David Giraud), draw another line to simulate the stitches (**Fig.103**).

Fig 103

104. Now you can use the standard Inflat Brush to add some folds to make the object look a bit more realistic (**Fig.104**)

Fig 104



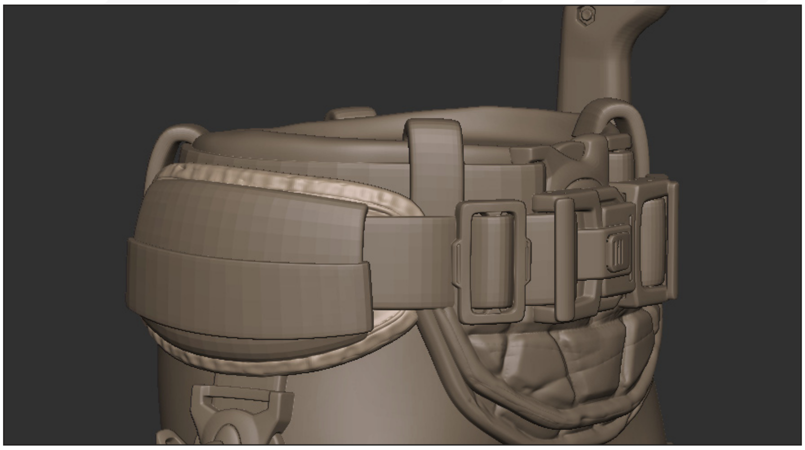


Fig 105

105. Here is a final Preview (**Fig.105**).

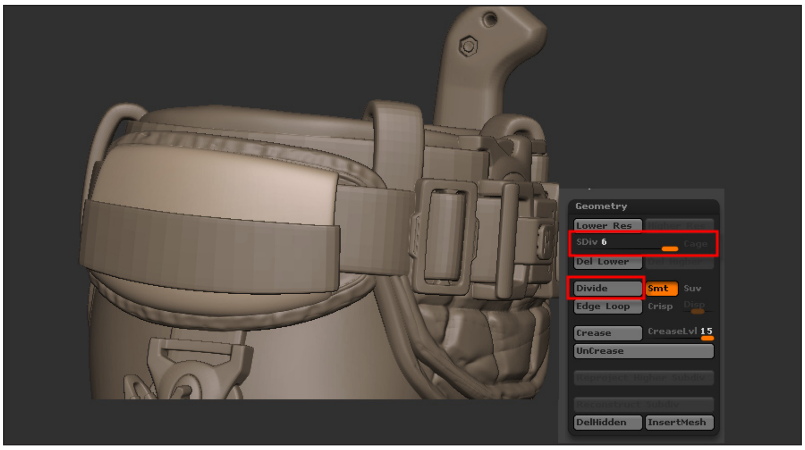


Fig 106

106. Select the object as shown below and subdivide it (**Fig.106**).

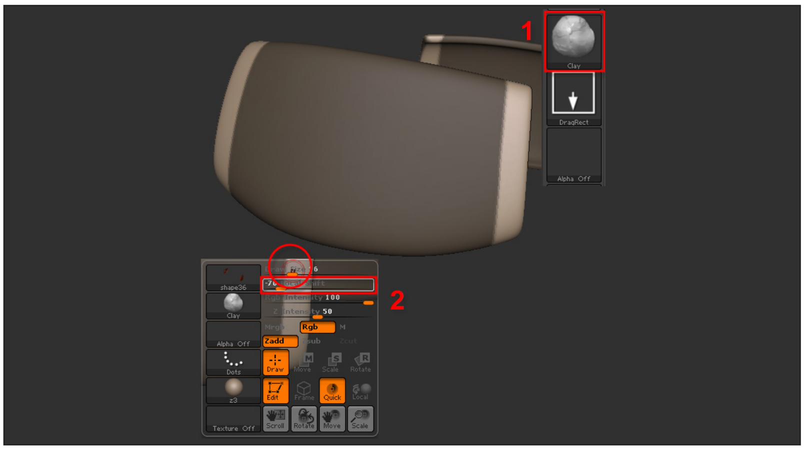


Fig 107

107. We are now going to create a mask so select the Clay brush and right click, changing its focal Shift value to make both circles closer. This will make the mask sharper (**Fig.107**).

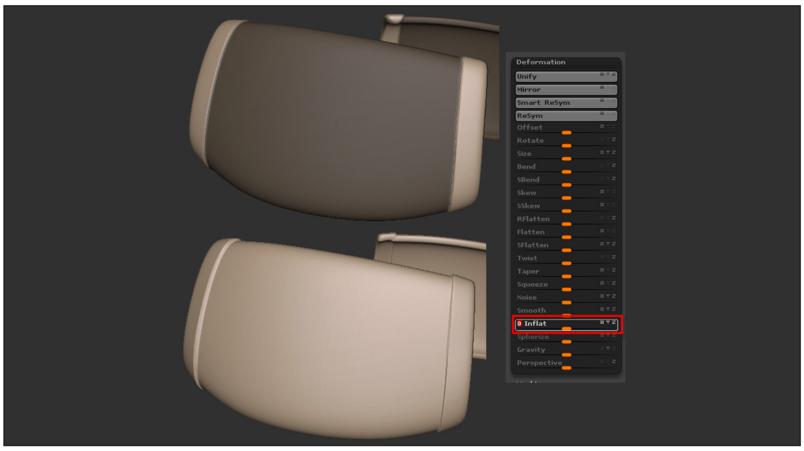
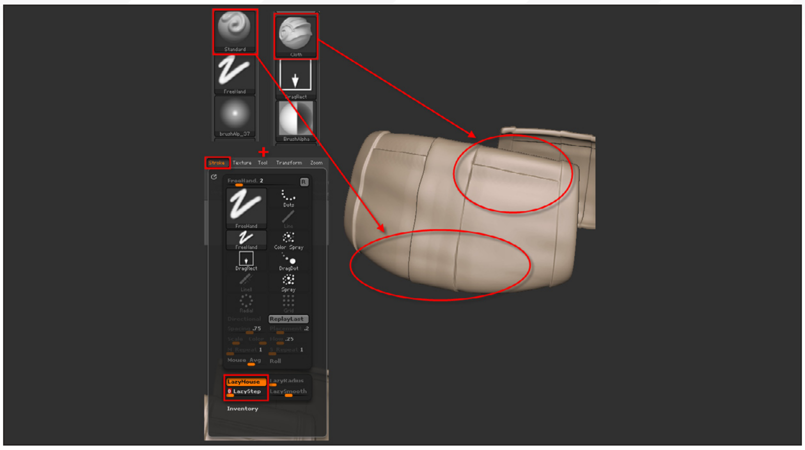


Fig 108

108. Now scroll down to the Deformation tab and change the Inflat Value. You could get exactly the same effect by using the Slash2 brush as above but I just wanted to introduce a different way of doing it (**Fig.108**).

109. This time you can use the slash2 brush to create more cloth pieces. You can also use the Standard brush with a low Z intensity to create the folds (**Fig.109**).

Fig 109



110. Once again use the customized brush to make the stitches (**Fig.110**).

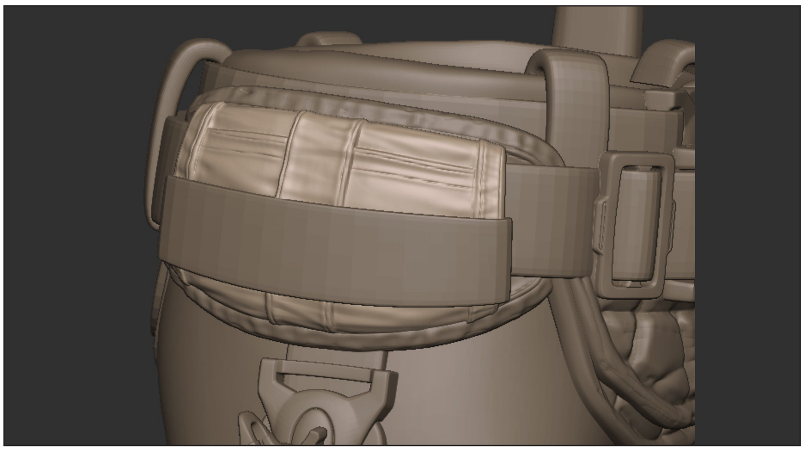
Fig 110

111. Use the Inflat brush for the smaller folds (**Fig.111**).

Fig 111

112. Here is a final preview (**Fig.112**).

Fig 112



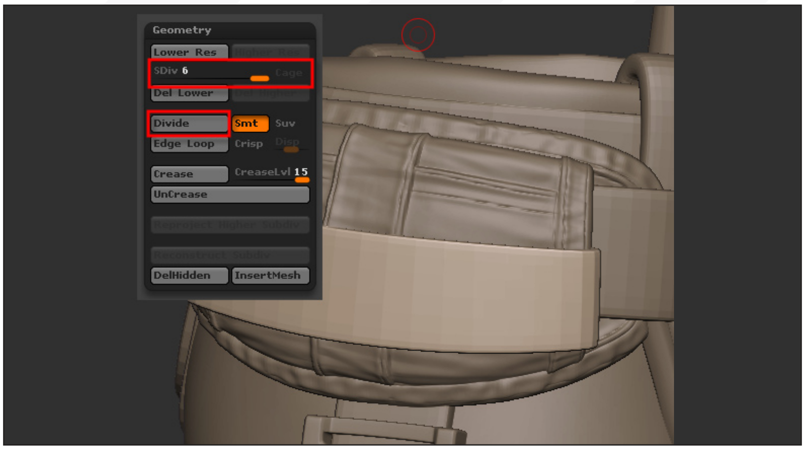


Fig 113a

113. Select another object and use the same procedure to complete it (**Fig.113a - c**).

Fig 113b

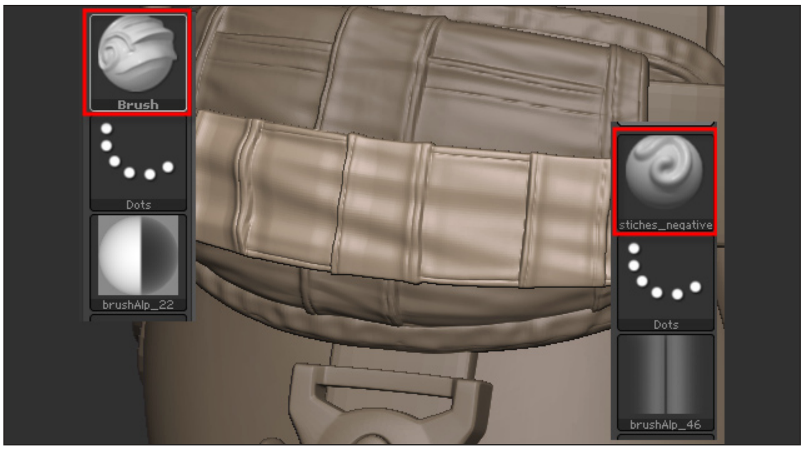


Fig 113c

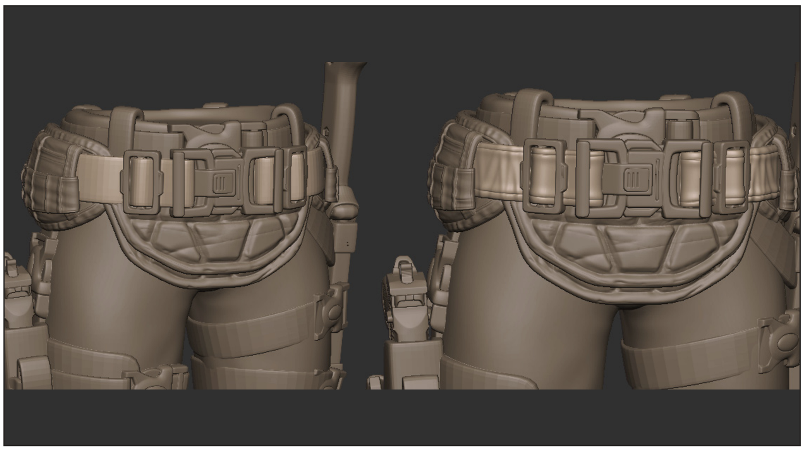
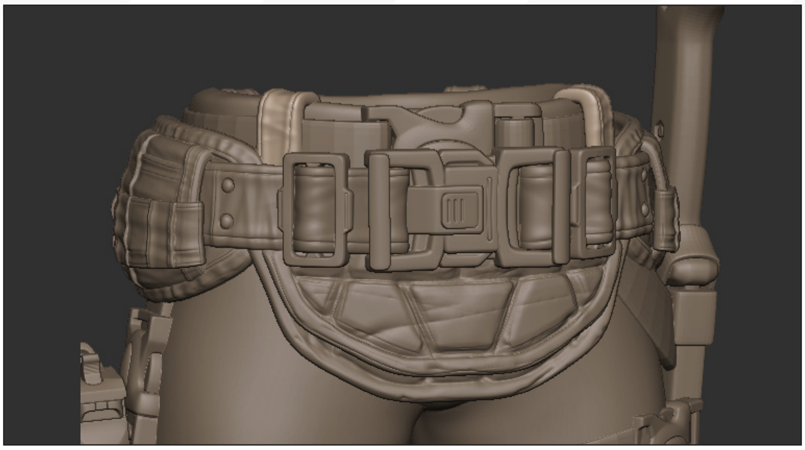


Fig 114

114. Here is the same process applied to the belt using the same technique (**Fig.114**).

115. Here are the belt elements (**Fig.115**).

Fig 115

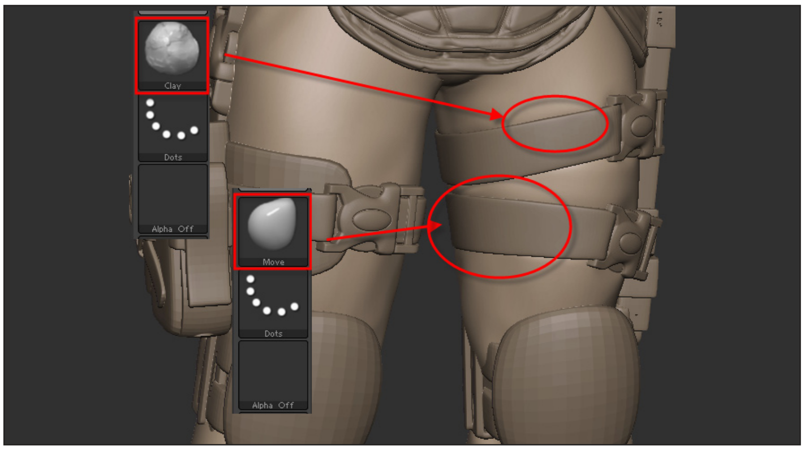


116. Here is the same for the second belt, for which we will use the same technique we used in the Chest chapter to create customized stitches using the alpha shown below (**Fig.116**).

Fig 116

117. We are now going to work on the straps but before we do this select the Clay brush and push in the pants to remove any artifacts (**Fig.117**).

Fig 117



118. Here is a final preview of the straps, still using the same technique to sculpt them (**Fig.118**).

Fig 118

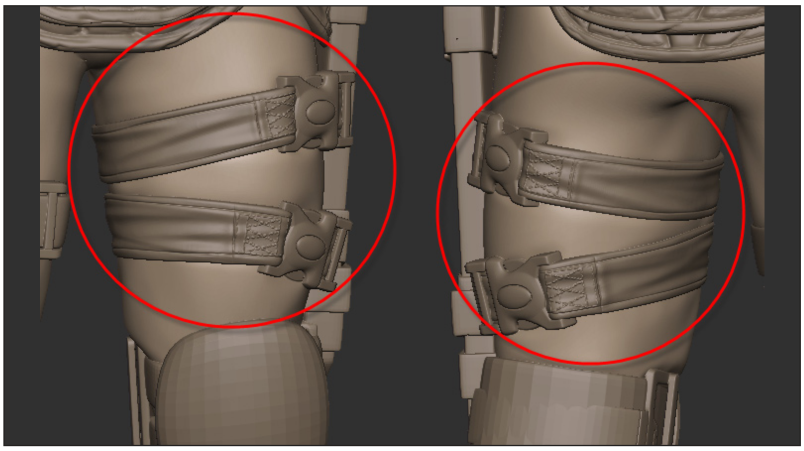


Fig 119

119. Let's work on the knee pads (**Fig.119**).

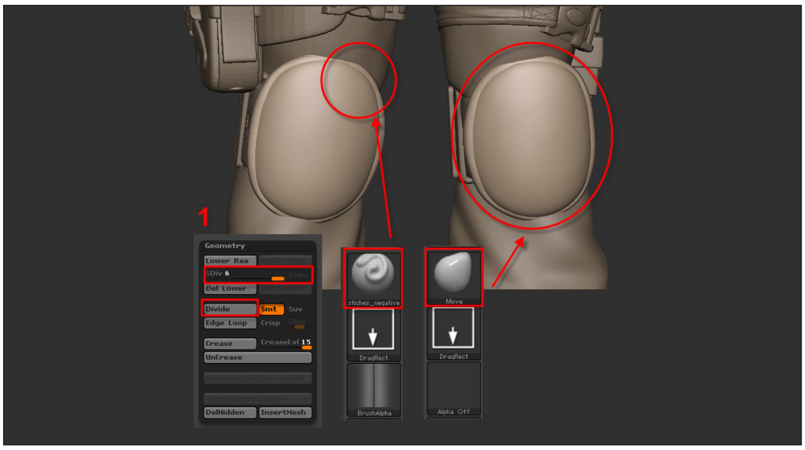


Fig 120

120. Modify the overall shape a little to get a better shape and with the customized brush draw a line around them to create the seam (**Fig.120**).

Fig 121

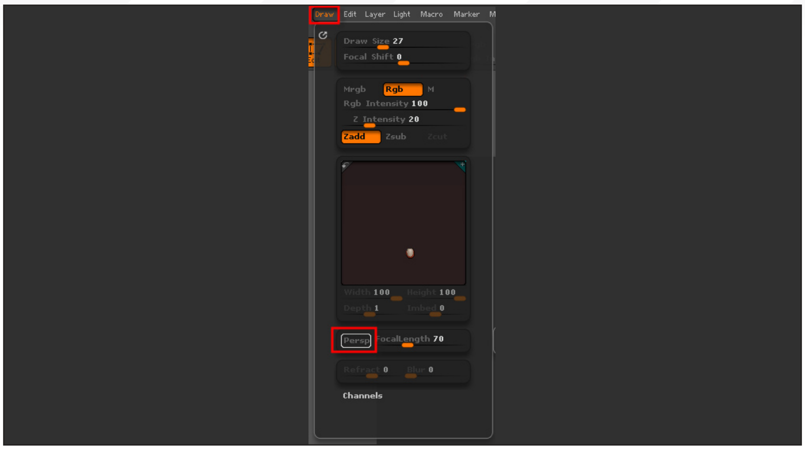
121. Here is a preview (**Fig.121**).

Fig 122

122. In order to work properly on the object, click on the eye on the right of the SubTool to hide all the surrounding objects (**Fig.122**).

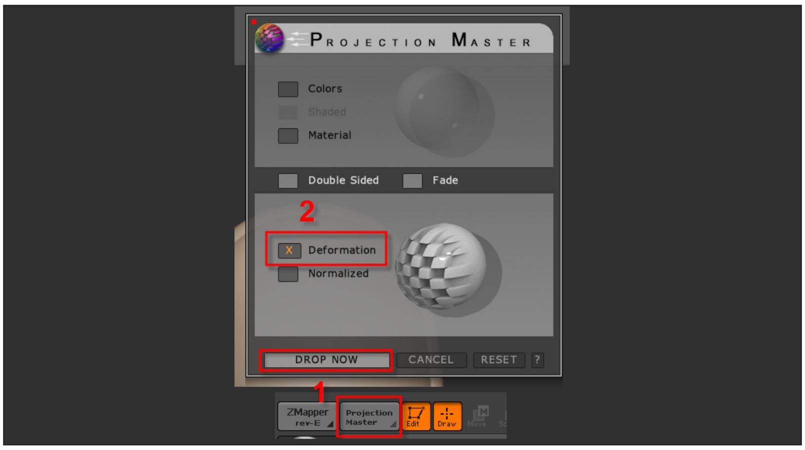
123. We are going to use the projection master to add a pattern across the knee pads. In order to get better results, you will need to turn the Perspective button off under the Draw tab (**Fig.123**).

Fig 123



124. Click on the Projection Master button along the top menu and uncheck everything except Deformation. Now press Drop now and you will be in the projection master mode (**Fig.124**).

Fig 124



125. You are now in projection master mode. On the right in the Tool Menu, select SimpleBrush. On the left select Line Stroke and below the Dam Standard alpha. Don't forget to change the Spacing value to 2, which will allow you to get some very clean lines. Finally press on Zsub button (**Fig.125**).

Fig 125

126. You can now draw some lines on the knee pad. (**Fig.126**)

Fig 126

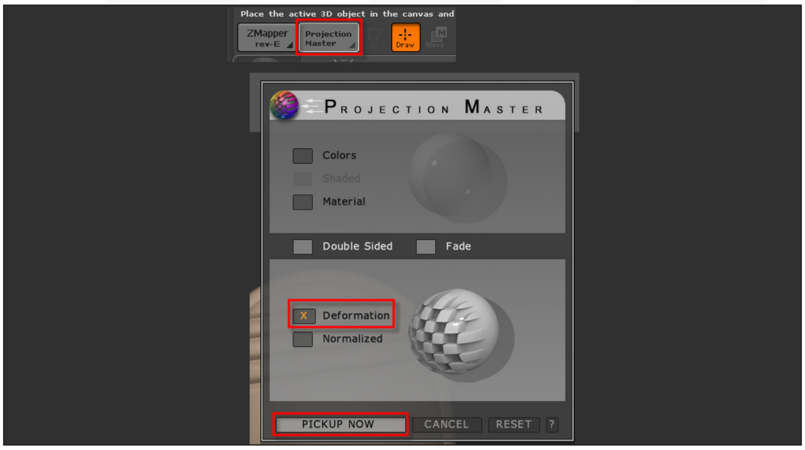


Fig 127

127. Once you are satisfied with your modifications, you can go back to the previous ZBrush sculpting mode by pressing the Projection Master button, keeping Deformation on and finally clicking on Pickup Now (**Fig.127**).

Fig 128

128. Here is the result (**Fig.128**).

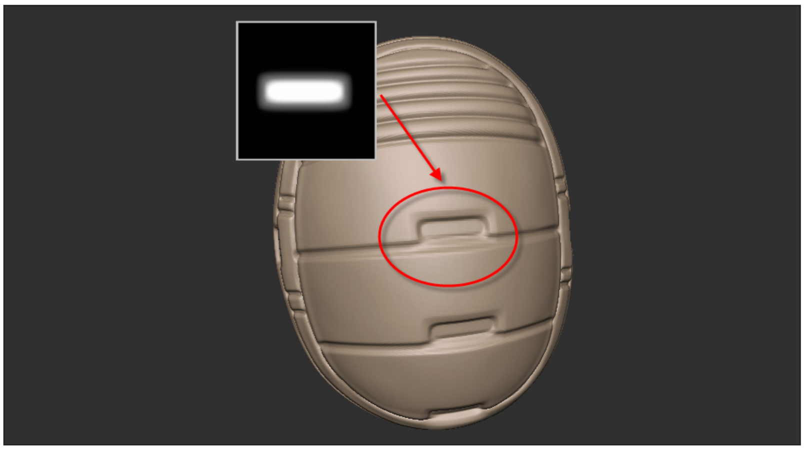


Fig 129

129. Don't hesitate to repeat this procedure if you want to add more lines. You can then re-use the alphas you created in the Chest chapter to add more definition (**Fig.129**).

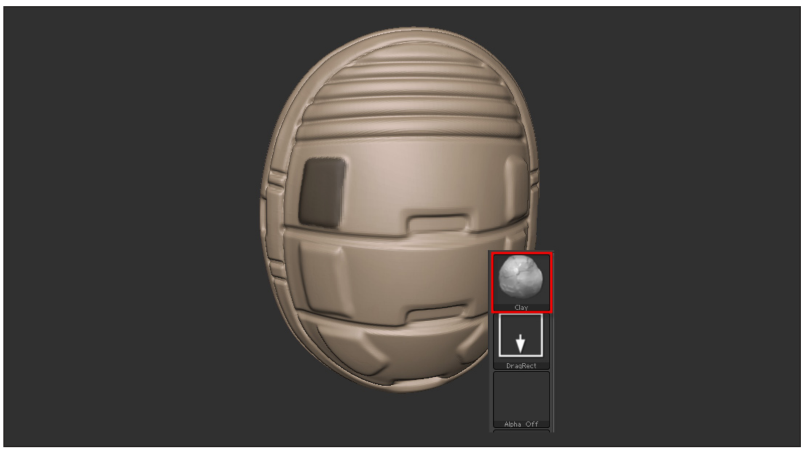


Fig 130

130. You can also use the mask technique to define more volume as explained above (**Fig.130**).

131. Ctrl click on that area if you want to smooth the selection and then change the Inflat value to extrude the masked selection (**Fig.131**).

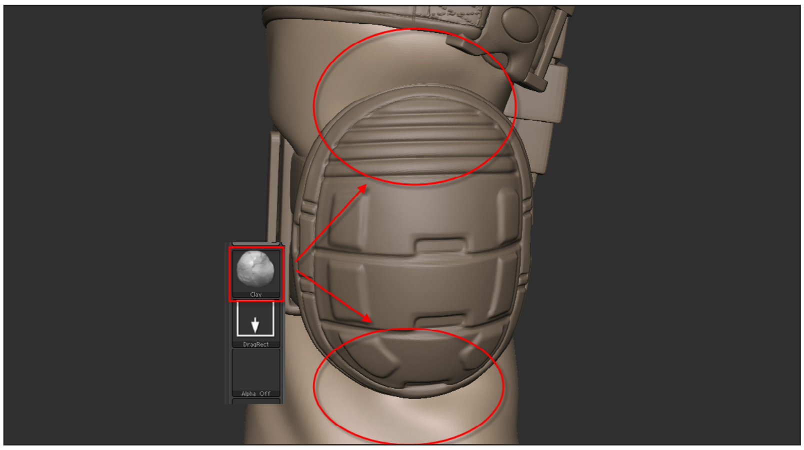
Fig 131

132. Here is a final preview (**Fig.132**).

Fig 132

133. You can now unhide the elements and use the Clay brush to push in the pants slightly (**Fig.133**).

Fig 134



134. And finally, you can use the Slash brush to add some scratches (**Fig.134**).

Fig 135

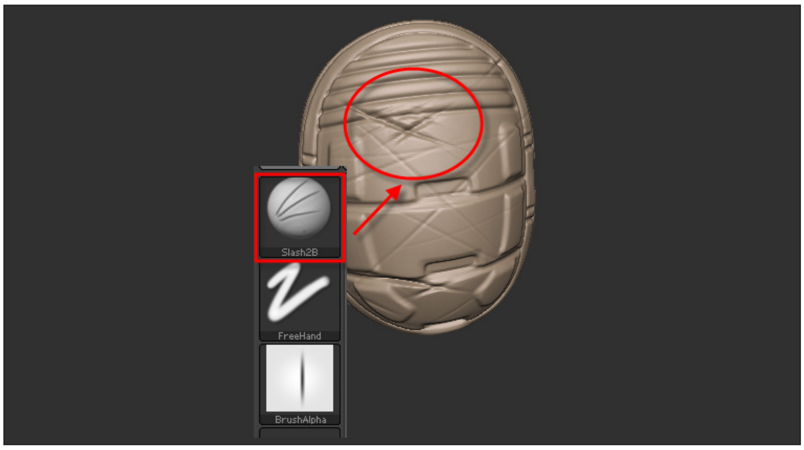


Fig 135

135. Now let's move onto the straps around the knee (**Fig.135**).

Fig 136

136. An another customized brush was used to add different details to the strap. A very simple alpha was created by using the technique explained in the previous chapter. With this brush selected, right click and change the Focal Shift value to make both circles closer. You now just have now to paint on the strap (**Fig.136**).

Fig 137

137. Here is a final preview (**Fig.137**).

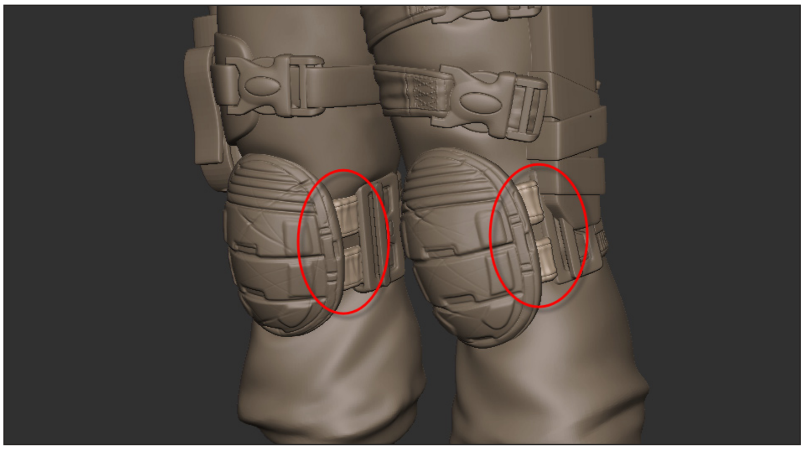


Fig 138

138. Here is a final preview for the small straps shown below (**Fig.138**).

139. Here are some previews of the other objects using the same techniques (**Fig.139a – b**).

Fig 139a

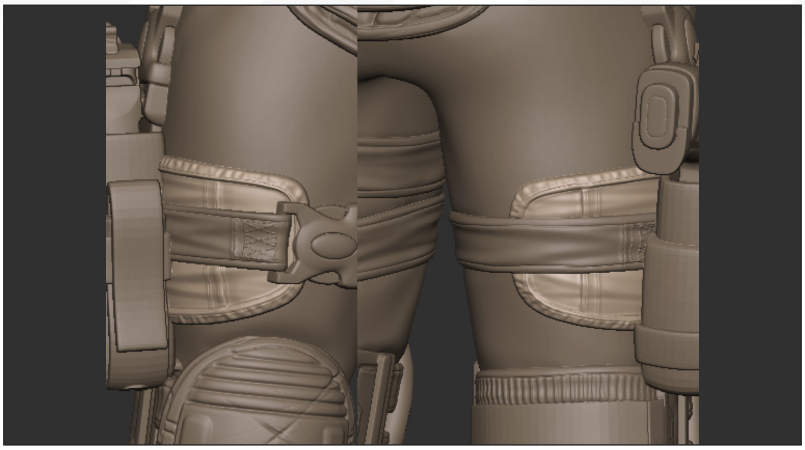
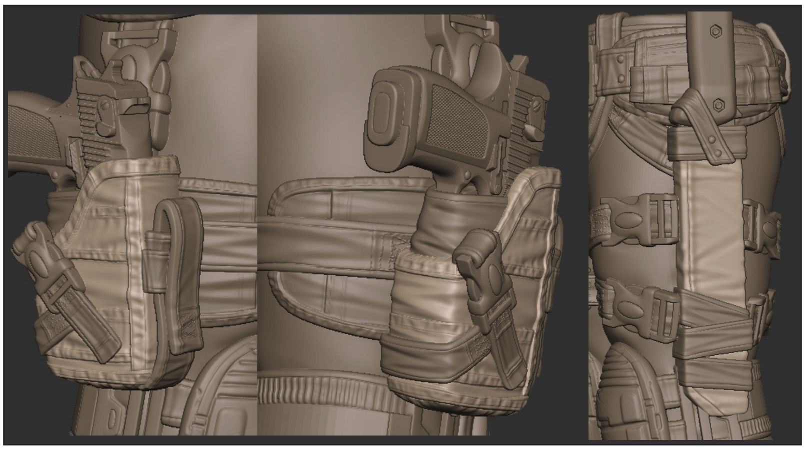


Fig 139b



140. A current preview (**Fig.140**).

Fig 140

141. We are now going to work on the pants. In order to sculpt them properly without any interference from the other objects you may wish to activate transparency (3).

To start sculpting folds, use the Standard brush with LazyMouse which I strongly recommend if you want smooth and clean folds. It's also good to paint these slowly as you will get better results (**Fig.141**).

Fig 141

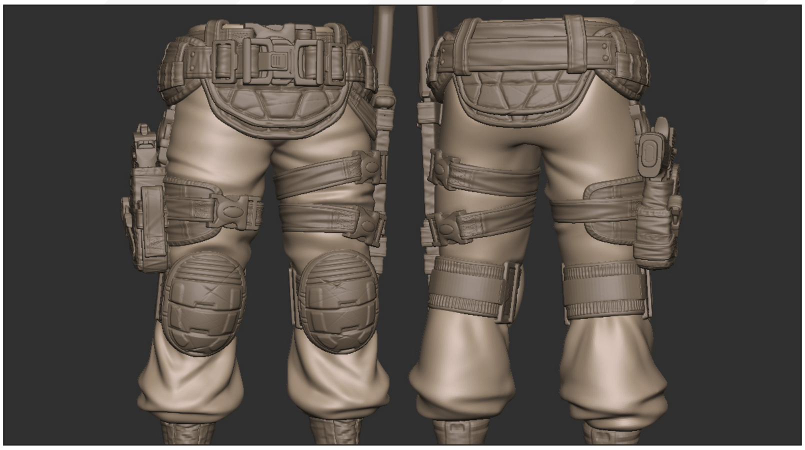


Fig 142a

142. Here are the pants step by step (**Fig.142a – 2**).

Fig 142b

Fig 143

143. Now let's move onto the seams using the Slash2 brush as explained above (**Fig.143**).

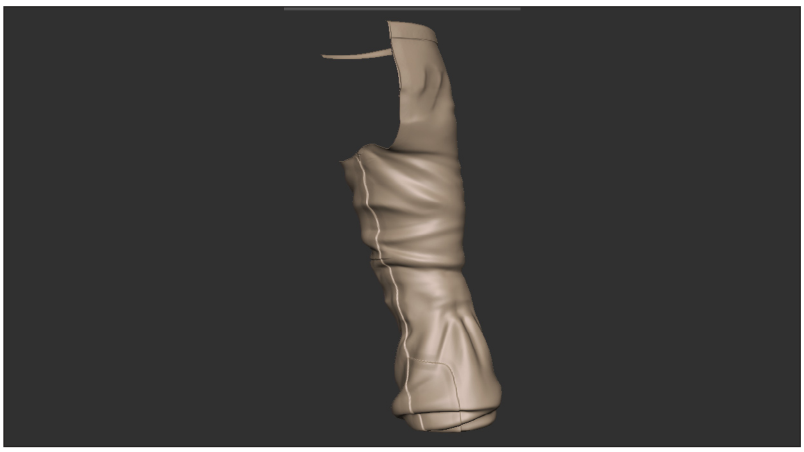


Fig 144

144. Don't hesitate to hide everything except the left or the right piece of the pants in order to sculpt the seams inside the legs (**Fig.144**).

145. Draw more lines with the customized stitches brush (**Fig.145**).

Fig 145

146. And once again using the Inflat brush, sculpt the small folds on each side of the seams to finish the details (**Fig.146**).

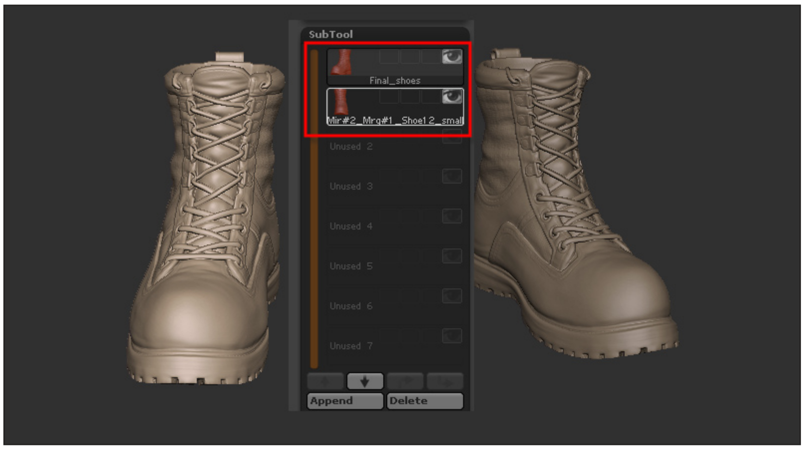
Fig 146

147. Lets' now replace the shoes with the real ones so first of all delete the existing one (**Fig.147**).

Fig 147

148. Open up your Zbrush file with your final shoes inside (**Fig.148**).

Fig 148



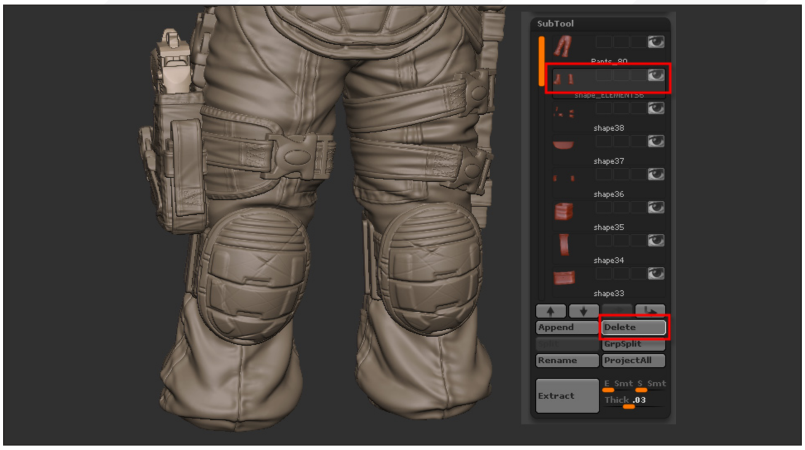


Fig 149

149. Go back to your pants Tool and be sure to delete the old shoes (**Fig.149**).

Fig 150

150. Append the real ones (**Fig.150**).

Fig 151

151. Here is a final preview, with the completed pants (**Fig.151**).

CEDRIC SEAUT

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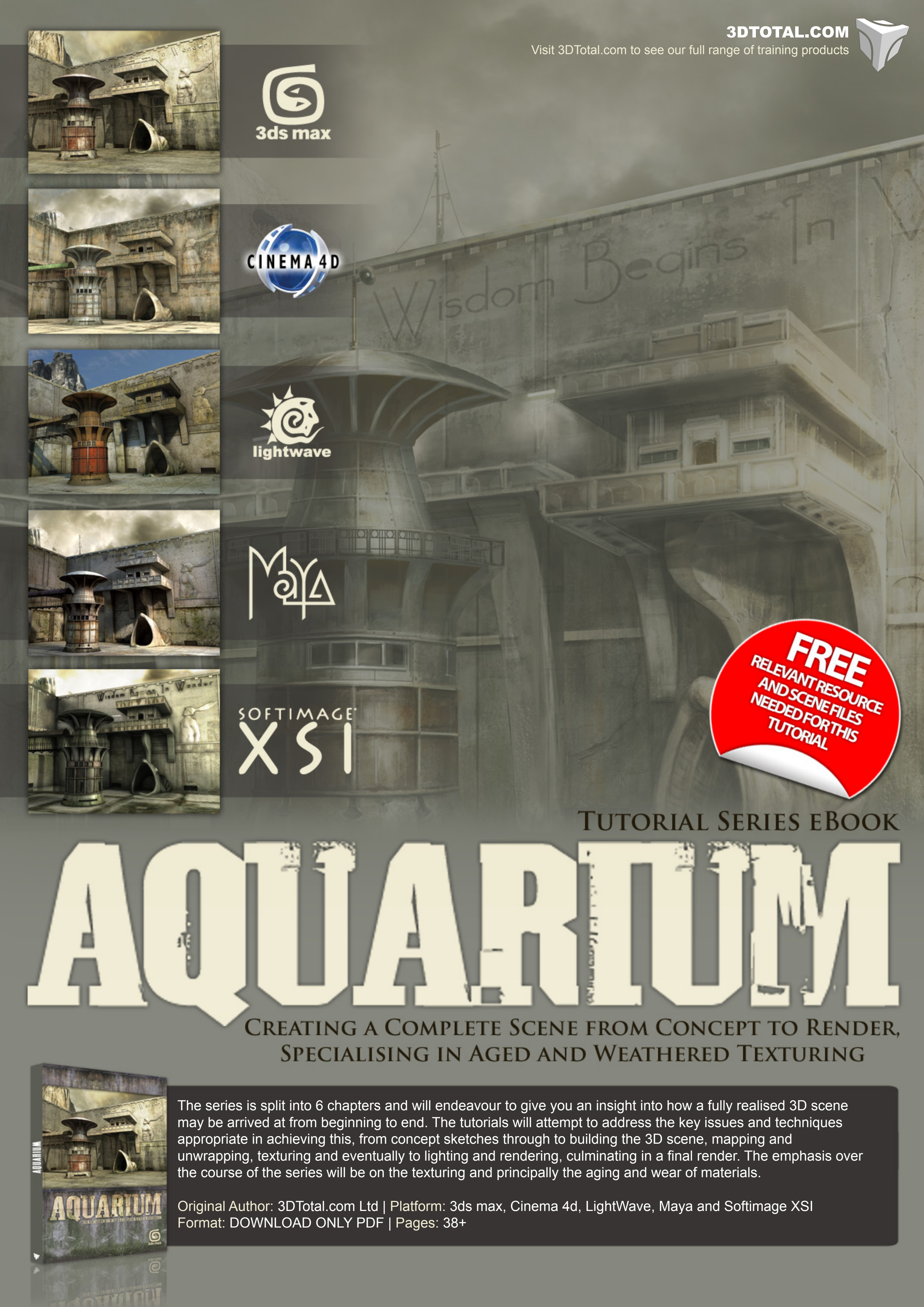
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